Restricted Serial Nº 9865

OPERATING MANUAL
FOR
NAVY MODELS
AYD-3 and ★AN/ARN-1
AIRCRAFT RADIO ALTIMETER EQUIPMENTS
(With 50 Ohm R-F Transmission System)

780

Manufactured for

NAVY DEPARTMENT—BUREAU OF SHIPS

Contractor

RADIO CORPORATION OF AMERICA

Camden, N. J., U. S. A.

Contract	Models	Mfr. Code
NXs-6722	AYD-3, ★AN/ARN-1	CDL
NXs-2[illegible]	★AN/ARN-1	CRV

IB-25933-1

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This instruction book is furnished for the information of commissioned, warranted, enlisted and civilian personnel of the Navy whose duties involve design, instruction, operation and installation of Radio equipment. The word "RESTRICTED" as applied to this instruction book signifies that this instruction book is to be read only by the above personnel, and the contents of it should not be made known to persons not connected with the Navy.

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RADIO CORPORATION OF AMERICA

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Contract	Models	Mfr. Code
NXs-6722	AYD-3, ★AN/ARN-1	CDL
NXs-2424	★AN/ARN-1	CRV

IB-25933-1

WARNING

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE. OPERATING PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE THE EQUIPMENT WITH VOLTAGE SUPPLY ON. UNDER CERTAIN CONDITIONS DANGEROUS POTENTIALS MAY EXIST IN CIRCUITS WITH POWER CONTROLS IN THE OFF-POSITION DUE TO CHARGES RETAINED BY CAPACITORS, ETC. TO AVOID CASUALTIES ALWAYS DISCHARGE AND GROUND CIRCUITS PRIOR TO TOUCHING THEM.

THE ATTENTION OF OFFICERS AND OPERATING PERSONNEL IS DIRECTED TO BUREAU OF ENGINEERING CIRCULAR LETTER No. 5a OF 3 OCTOBER, 1934, OR SUBSEQUENT REVISIONS THEREOF ON THE SUBJECT OF "RADIO—SAFETY PRECAUTIONS TO BE OBSERVED."

MEDICAL DEPARTMENT
UNITED STATES NAVY

ELECTRIC SHOCK
FIRST-AID TREATMENT

(DIVISION OF PREVENTIVE MEDICINE)
1942

SAFETY FIRST Regard electrical apparatus generally, and especially all current-carrying parts, as dangerous, irrespective of voltage. Exercise great care in handling, and avoid broad contacts such as are made by standing on a metal deck or in water.

Dangerous contact may result through lessened resistance when the skin and clothing are wet with perspiration. Contact with damp metal surfaces—decks, bulkheads, guns, machinery—may allow the current to ground through the moist skin and body.

Electric shock is due to current passing through the body—current actually passing—irrespective of the voltage. A pressure as low as 110 volts has caused death. Current passing through the body in the region of the heart is especially dangerous. In using electric breast drills avoid the possibility of a ground.

Usually electric shock does not kill instantly. Life can often be saved even though breathing has stopped.

I. FREE THE VICTIM FROM THE CIRCUIT IMMEDIATELY.

Use a dry nonconductor (rubber gloves, clothing, rope, board) to move either the victim or the wire. Beware of using metal or moist material.

Shut off the current.

If necessary to cut a live wire, use an ax or hatchet with a dry wooden handle; turn your face away from the electrical flash.

II. ATTEND INSTANTLY TO THE VICTIM'S BREATHING.

Begin resuscitation at once on the spot. Do not stop to loosen clothing; every moment counts.

RESUSCITATION BY THE PRONE PRESSURE METHOD OF ARTIFICIAL RESPIRATION

GAS ASPHYXIATION — ELECTRIC SHOCK — DROWNING

Waste no time. When the patient is removed from the water, gas, smoke, or electric contact, get to work at once with your own hands. Send for the medical officer or nearest physician.

No reliance should be placed upon any special mechanical apparatus, as it is frequently out of order and often is not available when most needed. The patient's mouth should be cleared of any obstruction such as chewing gum or tobacco, false teeth, or mucus, so that there is no interference with the entrance and escape of air.

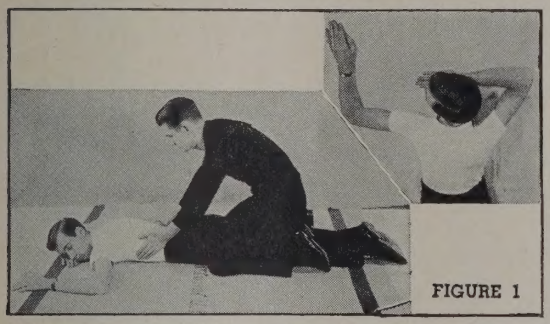

FIGURE 1

POSITION

1. Lay the patient on his belly, one arm extended directly overhead, the other arm bent at elbow and with the face turned outward and resting on hand or forearm, so that the nose and mouth are free for breathing. (See Inset, fig. 1.)

2. Kneel straddling the patient's thighs with your knees placed at such a distance from the hip bones as will allow you to assume the position shown in Figure 1.

Place the palms of the hands on the small of the back with fingers resting on the ribs, the little finger just touching the lowest rib, with the thumb and fingers in a natural position, and the tips of the fingers just out of sight. (See fig. 1.)

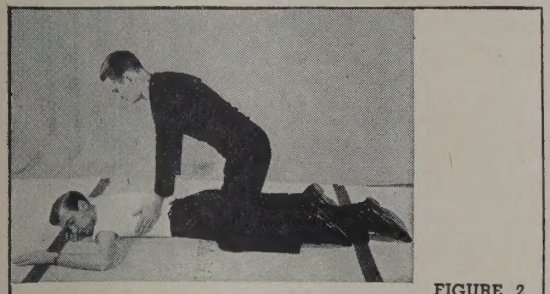

FIGURE 2

FIRST MOVEMENT

3. With arms held straight, swing forward slowly, so that the weight of your body is gradually brought to bear upon the patient. The shoulder should be directly over the heel of the hand at the end of the forward swing. (See fig. 2.) Do not bend your elbows. This operation should take about two seconds.

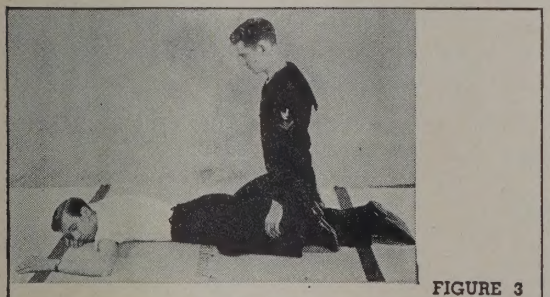

FIGURE 3

SECOND MOVEMENT

4. Now immediately swing backward, so as to remove the pressure completely. (See fig. 3.)

5. After two seconds, swing forward again. Thus repeat deliberately twelve to fifteen times a minute the double movement of compression and release, a complete respiration in four or five seconds.

6. Continue artificial respiration without interruption until natural breathing is restored. Do not get discouraged at the slow results that sometimes happen when resuscitating the apparently drowned. Efforts often have to be continued a long time before signs of life are apparent. Do not discontinue the efforts until certain that all chance is lost. Sometimes, even after several hours' work, recovery takes place.

7. As soon as this artificial respiration has been started and while it is being continued, an assistant should loosen any tight clothing about the patient's neck, chest, or waist. TO KEEP THE PATIENT WARM DURING ARTIFICIAL RESPIRATION IS MOST IMPORTANT AND IT MAY BE NECESSARY TO COVER HIM WITH BLANKETS AND WORK THROUGH THEM, AS WELL AS TO APPLY HOT-WATER BOTTLES, HOT BRICKS, ETC. Do not give any liquids whatever by mouth until the patient is fully conscious.

8. To avoid strain on the heart when the patient revives, he should be kept lying down and not allowed to stand or sit up. If the doctor has not arrived by the time the patient has revived, he should be given some stimulant, such as one teaspoonful of aromatic spirits of ammonia in a small glass of water or a hot drink of coffee or tea, etc. Continue to keep the patient warm and at rest.

9. Resuscitation should be carried on at the nearest possible point to where the patient received his injuries. As a general rule he should not be moved from this point until he is breathing normally of his own volition and then moved only in a lying position. Should it be necessary, due to extreme weather conditions, etc., to move the patient before he is breathing normally, resuscitation should be carried on during the time that he is being moved.

10. A brief return of natural respiration is not a certain indication for stopping the resuscitation. Not infrequently the patient, after a temporary recovery of respiration, stops breathing again. The patient must be watched, and if natural breathing stops, artificial respiration should be resumed at once.

11. In carrying out resuscitation it may be necessary to change the operator. This change must be made without losing the rhythm of respiration. The relief operator should kneel behind the one giving the artificial respiration and at the end of the movement, the operator crawls forward while the relief takes his place. By this procedure no confusion results at the time of change of operator, and a regular rhythm is kept up.

PRACTICE IN THE PERFORMANCE OF ARTIFICIAL RESPIRATION ON A VOLUNTEER SUBJECT SHOULD BE OBTAINED BY EVERYONE.

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I

GENERAL DESCRIPTION

1.1 INTRODUCTION — The AYD-3 and ★AN/ARN-1 Aircraft Radio Altimeter Equipments are designed for installation in aircraft to provide direct indication of altitude relative to the underlying terrain during flight. The equipments also may be used in conjunction with an automatic pilot. They are identical in function and performance, and largely similar in design to the earlier models AYD and AYD-2, but differ in regard to terminals and interconnections of the Radio Transmitter-Receiver, Antennas and Altitude Indicator, preventing interchangeability of these individual units and cables.

1.2 Referring to the equipment diagram, Figure 3, direct indication of altitude is given by the Altitude Indicator, the full scale reading of which corresponds to the maximum altitude range of the equipment. Provision is also made for operating an auxiliary Altitude Limit Indicator which can be used in conjunction with either the Altitude Indicator or the Automatic Pilot, with both of these units, or independently if desired. Altitude steps are provided as marked on the dial of the Altitude Limit Switch.

1.3 When used without the Automatic Pilot, the Altitude Limit Indicator informs the pilot whether he is flying below, on, or above the altitude for which the Altitude Limit Switch is set. When used with the Automatic Pilot, the Altitude Limit Indicator indicates the **attitude (or pitch) corrections**—upward, none, or downward—which are necessary to reach or maintain the altitude for which the Altitude Limit Switch is set. The Altitude Limit Indicator may utilize three lamps of different colors (a suggested arrangement is shown in the upper left inset of Figure 3) or any suitable alternative signalling system which may be specified by the Navy Department, Bureau of Aeronautics.

1.4 EQUIPMENT SUPPLIED—The complete AYD-3 and ★AN/ARN-1 altimeter equipments with accessories are shown on the equipment interconnection diagram, Figure 3. Bulk cable and fittings are furnished for fabricating the interconnecting cables in accordance with the referenced outline-assembly drawings. Dimensions and weights of all components are included on the referenced outline drawings. The overall dimensions and weights of the major units are summarized in the table below.

1.5 ADDITIONAL EQUIPMENT REQUIRED —Equipment which may be required for a complete installation but which is not included with the AYD Series or ★AN/ARN-1 equipments is as follows:

1—D-c power source (see paragraph 1.7) and suitable cable for connecting same to the Radio Transmitter-Receiver.

1—Altitude Limit Indicator (if and as specified by the Navy Department, Bureau of Aeronautics) and suitable cable for connecting same to the Radio Transmitter-Receiver.

1—Automatic Pilot (if and as specified by the Navy Department, Bureau of Aeronautics).

1—Set of safety wire and miscellaneous hardware as may be required for the particular installation.

Unit	Outline Drawing	Overall Dimensions (Inches)			Weight (Pounds)
		Width	Depth	Height	
Radio Transmitter-Receiver (Assembled on Shock Mounting)	Fig. 4	$18\frac{1}{16}$	$8\frac{25}{32}$	$7\frac{21}{32}$	19.2
Radio Transmitter-Receiver (Chassis and Case Assembly)	Fig. 4	$18\frac{1}{16}$	$8\frac{19}{32}$	$7\frac{9}{64}$	17.7
Shock Mounting Assembly	Fig. 4	$18\frac{1}{16}$	$7\frac{5}{8}$	$2\frac{1}{4}$	1.5
Altitude Indicator*	Fig. 5	$3\frac{1}{4}$	$4\frac{7}{16}$ max.	$3\frac{1}{4}$	1.55
Altitude Limit Switch	Fig. 6	$3\frac{1}{4}$	$5\frac{23}{32}$	$3\frac{1}{4}$	0.95
Antenna Assembly (2)**	Fig. 7	$11\frac{9}{16}$	$1\frac{25}{32}$	$7\frac{9}{16}$	0.7 ea.

* With Model AYD-3 the Altitude Indicator is furnished in limited quantities as specified by the contract.
** One Antenna Assembly is furnished for transmitting and one for receiving.

1.6 OVERALL WEIGHTS—The total weight of the equipment units furnished, as tabulated below, is 23.1 pounds with, and 21.55 pounds without the Altitude Indicator. The overall weight of the equipment when installed varies with the combination of units and the lengths of the cables required by the particular installation. Information for determining the weights of the cables (for which materials are furnished) is given on the cable assembly drawings, Figures 9 and 10.

1.7 POWER SUPPLY — The AYD-3 and ★AN/ARN-1 (27 V.) altimeter equipments are designed for d-c operation at 24 to 28.6 volts and consume approximately 2.5 amperes with the normal 27 volts at the power input receptacle. The ★AN/ARN-1 (13.5 V.) equipment is designed for operation at 12 to 14.3 volts d-c and consumes approximately 5.0 amperes at 13.5 volts. These current values include the currents which are delivered, at full Transmitter-Receiver input voltage, to the Altitude Limit Indicator and to the Automatic Pilot through receptacles J105 and J106 (see Figure 3).

II

INSTALLATION

IMPORTANT (1)—SATISFACTORY PERFORMANCE OF THE AYD SERIES ALTIMETER EQUIPMENTS IS DEPENDENT UPON PROPER ARRANGEMENT AND INSTALLATION OF THE ANTENNAS. DETERMINATION OF THE BEST ANTENNA ARRANGEMENT FOR A SPECIFIC APPLICATION INVOLVES TECHNICAL CONSIDERATIONS WHICH ARE BEYOND THE SCOPE OF THIS MANUAL. IN EVERY APPLICATION WHICH INVOLVES A NEW AIRCRAFT DESIGN AND/OR A DIFFERENT COMBINATION OF OTHER RADIO EQUIPMENT, THE ANTENNA LAYOUT SHOULD BE APPROVED BY A COMPETENT TECHNICIAN WHO IS THOROUGHLY FAMILIAR WITH THE BASIC PRINCIPLES EXPLAINED IN THE "AYD-3 AND ★AN/ARN-1", "AYD AND AYD-2," AND "AYB-1" MAINTENANCE MANUALS.

IMPORTANT (2)—PROPER FUNCTIONING OF THE ALTIMETER IN CONJUNCTION WITH THE AUTOMATIC PILOT IS DEPENDENT NOT ONLY UPON CORRECT PERFORMANCE OF THE ALTIMETER EQUIPMENT BUT ALSO UPON SATISFACTORY CORRELATION OF THE DESIGN AND ADJUSTMENT OF THE AUTOMATIC PILOT WITH THE CHARACTERISTICS OF BOTH THE ALTIMETER AND THE INDIVIDUAL AIRCRAFT. IN EVERY APPLICATION WHICH INVOLVES A NEW AIRCRAFT DESIGN AND/OR ANY MODIFICATION OF THE AUTOMATIC PILOT, THE COMPLETE INSTALLATION LAYOUT SHOULD BE APPROVED BY AN EXPERT TECHNICIAN WHO IS THOROUGHLY FAMILIAR WITH THE FUNDAMENTAL PRINCIPLES INVOLVED AND WITH THE BASIC REQUIREMENTS EXPLAINED IN THE "AYD-3 AND ★AN/ARN-1," ALSO "AYD AND AYD-2," MAINTENANCE MANUALS.

2.1 GENERAL—The design of the AYD-3 and ★AN/ARN-1 altimeter equipments permits considerable flexibility of installation of the components and accessories, which are shown on the equipment interconnection diagram, Figure 3. The antennas can be installed on the under surface of either the wings or the fuselage. The Altitude Indicator (which includes the Power Switch) and the Altitude Limit Switch are designed for instrument panel mounting and should be located within easy reach and visibility of the pilot. The Radio Transmitter-Receiver can be installed in any desired location complying with the requirements listed in paragraph 2.3. The Automatic Pilot and the Altitude Limit Indicator, which are not supplied with the AYD Series or ★AN/ARN-1 equipments, must be designed for operation at the same input voltage as the Radio Transmitter-Receiver and are to be installed in accordance with instructions issued by the Navy Department, Bureau of Aeronautics.

2.2 RADIO TRANSMITTER - RECEIVER — This unit, shown in Figure 4, is designed for use with a shock mounting assembly which is to be attached permanently to the aircraft structure. The chassis and front panel together with the dust cover comprise a unit which is detachable from the shock mounting by loosening two snap fasteners. Also, the chassis including the front panel can be removed from the dust cover (without detaching the latter from the shock mounting) by loosening two thumb screws. Before installing this unit, the chassis should be removed and carefully inspected to make sure that all tubes are properly seated in the sockets.

IMPORTANT—The Radio Transmitter-Receiver unit must be laboratory checked before installation and its calibration adjusted as required to compensate for the inherent "residual" altitude (or altitude "delay") of the specific installation, in accordance with instructions contained in the Maintenance Manual. Once so adjusted, this unit is interchangeable (without recalibration) only with other units identically adjusted.

2.3 In determining the location of the Radio Transmitter-Receiver, consideration should be given to the following factors:

(a) The front panel must be accessible for adjustments, replacement of fuses and attachment of cables.

(b) Clearance must be provided to permit complete freedom of motion of the unit on its shock mounting.

(c) Although the equipment is designed to withstand continuous operation at ambient temperatures as high as 50 degrees centigrade (122 degrees Fahrenheit) the location of the Radio Transmitter-Receiver should be chosen with due consideration to the ambient temperature and freedom of air circulation around the unit. (Approximately 60 watts is dissipated within the unit.)

(d) It is desirable that space be available for servicing the unit when necessary under actual operating conditions.

(e) The location with respect to other units must conform with specific requirements of cable lengths (see paragraph 2.16 and Figure 3). Excessive lengths of the cables should be avoided so as to minimize (1) r-f attenuation in the antenna circuits, (2) voltage drops in the power circuits and (3) the overall weight of the installation.

2.4 The Radio Transmitter-Receiver is to be mounted on a horizontal surface in a convenient operating location selected in accordance with the foregoing recommendations. With the unit removed from the shock mounting assembly, fasten

the latter to the supporting surface (after drilling the surface according to the plan shown dotted in the top view, Figure 4) by means of sixteen No. 8 machine screws (not furnished), four through each foot and the mounting surface. Make sure that a good electrical contact is made to the aircraft structure at each foot, so as to effectively ground the unit through the locking devices and the individual grounding straps which connect each foot to the shock mounting frame. This will promote safety and minimize possible electrical interference with other radio equipment. After being laboratory calibrated for the residual altitude of the particular installation (see paragraph 2.2, "IMPORTANT"), the Radio Transmitter-Receiver unit may be slid into position and locked to the shock mounting assembly.

2.5 ALTITUDE INDICATOR — This unit, shown in Figure 5, is to be mounted in accordance with standard practice for "AN" type instruments, in a position which provides the required space for removal of the cable, and suitable scale illumination. (Numerals, major graduations and a portion of the pointer are radioactively luminous; minor graduations, tip of pointer and descriptive markings are fluorescent-phosphorescent.) The instrument panel or other surface, selected for convenience of the pilot in observing the indicator scale and operating the power switch, is to be cut out and drilled to provide clearance for the meter rim, three mounting screws and the power switch shaft as dimensioned in Figure 5. Remove the power switch knob by loosening its setscrew (an Allen wrench is provided for this purpose in a spring holder located inside the Radio Transmitter-Receiver, at top left end of chassis). Place the unit in position and fasten with three No. 6-32 mounting screws (not furnished), then replace the knob.

IMPORTANT—When the Altitude Indicator is not energized, the pointer is normally resting against a stop and indicates below zero on the scale. DO NOT DISTURB THIS SUB-ZERO ADJUSTMENT.

2.6 ALTITUDE LIMIT SWITCH—This unit, shown in Figure 6, is likewise to be mounted according to standard practice for "AN" type instruments, using four No. 6-32 mounting screws. It should be mounted on the instrument panel or in another location convenient to the operator, where space is available for removal of the cable and where suitable illumination is provided for its fluorescent-phosphorescent scale and indicator knob.

2.7 ANTENNAS—See "IMPORTANT" note (1) under the heading "INSTALLATION" at the beginning of this section. The main objectives of the antenna installation are to radiate and receive as much signal in a generally downward direction, and to transfer as little direct "feed through" signal from the transmitting antenna to the receiving antenna, as possible. Also, it is desirable to have the received reflected signal vary as little as possible with the position or **attitude** of the plane when executing a reasonable dive, climb or bank.

2.8 The transmitting and receiving antennas (Figure 7) are identical in mechanical and electrical characteristics. Unless there is a possibility of mutual interference with other radio equipment on the airplane (see paragraph 2.14), either antenna may be used for transmitting or receiving without affecting the operation of the altimeter equipment in any way.

2.9 The antennas are to be located where there are no protruding obstructions such as struts, wires, tubes, etc., within a distance of two feet. **No obstructions should exist in the shortest direct ground reflection path between the transmitting and receiving antennas at any flying position for which altimeter operation is required, as the shielding effect of such obstructions may interrupt the received signal and cause the altimeter and automatic pilot to function erratically.**

2.10 Each antenna will require a metal reflector at least two feet square which should be approximately flat, flush with and parallel to the antenna grounding plate. The outer metal surface of the modern aircraft inherently meets this requirement. If the mounting surface is fabric covered, a separate thin metal plate is to be installed centrally with respect to each antenna as indicated in Figure 8, or the fabric may be metalized by a suitable metal spray if preferred. The surface of each reflector adjoining the antenna grounding plate is to be thoroughly cleaned to insure good electrical contact with the antenna grounding plate.

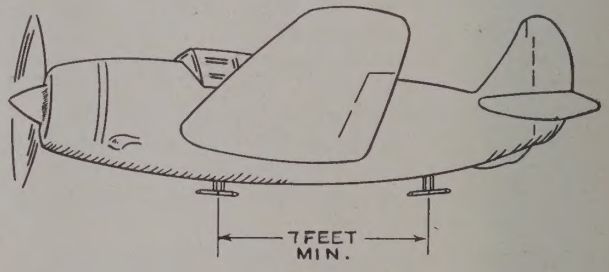


Figure 1—"In-Line" Antenna Arrangement—Under-Fuselage Mounting

2.11 "In Line" Antenna Arrangement—One of the most satisfactory antenna arrangements is to mount the two antennas on the under surface of the fuselage, with the horizontal members aligned **on a common axis** parallel to the axis of the fuselage, as shown in Figure 1. With a spacing of approximately seven feet between centers, no intermediate shielding is necessary when the antennas are installed in this manner. If the particular installation requires, this spacing may be increased to 12 or 14 feet.

2.12 Care should be exercised in making an "in line" antenna installation that there are no nearby objects which can act to reflect an appreciable

"feed through" signal from the transmitting antenna to the receiving antenna. Such objects might be torpedoes, bombs or floats. In the case of torpedoes or bombs, it is often possible to align the antennas on a common axis with the obstruction. This usually reduces the reflected signal from this source to a satisfactory level.

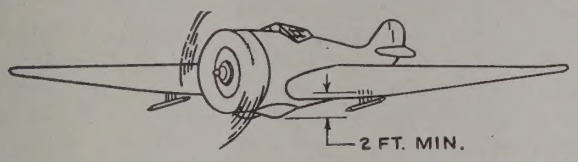


Figure 2—"Shielded" Antenna Arrangement—Under-Wing Mounting

2.13 "Shielded" Antenna Arrangement—Another satisfactory antenna arrangement is to use some metal part of the airplane with suitable electrical continuity, such as fuselage, motor mounts, etc., as shielding between the transmitting and receiving antennas. One arrangement of this type is illustrated in Figure 2. This type of antenna installation is particularly suitable for airplanes having "mid" or high wings.

2.14 In cases where this equipment must work simultaneously with other radio transmitting equipment which is operating on somewhere near the same frequency as the altimeter, very careful consideration must be given to the antenna installations of both equipments. The main objective, insofar as the AYD Series or ★AN/ARN-1 equipment is concerned, is to arrange for minimum pickup by its receiving antenna from the transmitting antenna of the other equipment. This may be accomplished by suitable consideration of the radiation patterns involved, possible shielding by the metal construction of the airplane, etc.

2.15 Installing the Antennas—Details of the antenna installation are shown in the diagram, Figure 8. **In all installations, the two antennas should be mounted with the horizontal radiating member parallel to the line of flight and with the thicker edges of the vertical members forward so as to obtain minimum slip-stream resistance.** The drilling plan for mounting the antennas is shown in Figure 7. It is to be noted that the 1⅛ inch square hole is to be located toward the rear so that the thicker edges of the streamlined vertical members will face forward. Each antenna is to be mounted securely with four No. 8 machine screws (not furnished) in accordance with the instructions given in paragraph 2.20.

IMPORTANT—If at any time it becomes necessary to paint the antennas, avoid getting any paint on the insulator ring at the mid-section of the horizontal radiating member.

2.16 INTERCONNECTING CABLES—The cable connections between the units are shown on the interconnection diagram, Figure 3. Since the cable lengths are determined by the requirements of a particular installation, the cable materials are furnished in bulk, as listed on the cable assembly drawings, Figures 9 and 10. (With the exception of the connectors for attaching to the Radio Transmitter-Receiver, materials are not supplied for either the Battery Input or the Altitude Limit Indicator cables.) All cables should be as short as possible after meeting the following requirements:

(a) Sharp bends are to be avoided. The minimum bending radius of each cable (for which materials are furnished) is specified on Figure 3.

(b) Sufficient length is to be provided for disconnecting cables from units.

(c) It may be desirable to provide sufficient length to permit removal of units for servicing while operating.

(d) The **combined** length of the two antenna transmission lines W501 and W502 must not be less than 15 feet nor greater than 50 feet (to permit adjustment for residual altitude —see paragraph 2.2, "IMPORTANT").

(e) The length of the Altitude Indicator cable W503 should be limited so as not to exceed a total resistance of the power switch leads (connected to terminals A and B of P104 and P201—see Figure 10, items 1A and 1B) of **0.12 ohm for 13.5 volt models** (equivalent to 15 feet of specified cable having B. & S. Gauge No. 16 switch leads), in order to avoid an excessive input voltage drop.

2.17 Detailed information for assembling the r-f transmission lines which connect the Radio Transmitter-Receiver to the two antennas is given on Figure 9. Assembly information for the three multiple-conductor cables (connecting the Radio Transmitter-Receiver to the Altitude Indicator, Altitude Limit Switch and Automatic Pilot) is given on Figure 10.

IMPORTANT—For all soldered connections use only rosin flux solder. Do not use flux which is in the slightest degree corrosive. Avoid excess solder.

2.18 Cable Tests—After the cables and transmission lines have been assembled, they should be checked for electrical continuity of the shield ground path between the connector shells, also for continuity of all conductors between the corresponding terminals at opposite ends. Check also for voltage breakdown from each terminal to connector shell, and to each of the other terminals on the multiple conductor cables, by application of 1000 volts d-c or 700 volts a-c (r.m.s) from a source protected by a circuit breaking device to prevent damage if breakdown should occur.

2.19 Before installing the antenna transmission lines, their lengths should be carefully measured. It is suggested that a record of these lengths be

kept for each installation. The calibration of the Radio Transmitter-Receiver (see paragraph 2.2, "IMPORTANT") will be partially governed by these measurements.

2.20 ANTENNA CONNECTIONS — Aside from interference effects which may occur when the altimeter equipment is operated simultaneously with other radio equipment on the aircraft (as explained in paragraph 2.14), either antenna can be connected for transmitting and the other for receiving, without effect on the altimeter operation. The coaxial r-f transmission lines W501 and W502 are to be connected to the antennas either directly or by means of the two elbow adapters* E507 and E508 as indicated in Figure 8. **Tighten the coupling nuts firmly by hand, being careful to engage the teeth at the male ends of the fittings with the notches at the female ends. Check engagement and firmness by jiggling the connections frequently while tightening.** After the antennas have been mounted and the Radio Transmitter-Receiver has been calibrated for the installation, the r-f transmission lines may be similarly attached to receptacles J101 and J102 at the Radio Transmitter-Receiver either directly or by means of the two elbow adapters* E509 and E510 as indicated in Figure 3.

2.21 INDICATOR AND CONTROL CONNECTIONS—Connect the Altitude Limit Switch to the Radio Transmitter-Receiver by means of cable W504, as indicated in Figure 3. **Tighten the coupling nuts firmly by hand.** If the Altitude Indicator is to be used, similarly connect this unit to the Radio Transmitter-Receiver by means of cable W503. If the Automatic Pilot is to be used, connect cable W505 to the Radio Transmitter-Receiver as indicated. The other end of this cable is to be connected to the Automatic Pilot according to instructions issued by the Navy Department, Bureau of Aeronautics.

2.22 Altitude Limit Indicator—As the Altitude Limit Indicator and its connecting cable are not supplied with the AYD Series and ★AN/ARN-1 equipments, instructions for installing and connecting this device will be issued separately by the Navy Department, Bureau of Aeronautics. A suggested arrangement using colored lights is shown in the upper left inset on Figure 3. **Refer to "CAUTION" notice on Figure 3 if the altimeter is to be operated in conjunction with an automatic pilot system. Make sure that the voltage rating of the Altitude Limit Indicator corresponds to that of the Radio Transmitter-Receiver.**

2.23 AUXILIARY PLUGS—If the Altitude Indicator is **not used,** it is necessary to insert the auxiliary plug P109 (Figure 11, item 9) in the Altitude Indicator receptacle J104 of the Radio Transmitter-Receiver, replacing plug P104 of cable W503 as noted on Figure 3. Terminals A and B of P109 must be short-circuited or connected to a separate switch in order to complete the battery input circuit.** A cap E506, with internal insulating disc, is furnished for use with this plug when the short-circuiting method is used. Also, in the event that the Altitude Limit Indicator is to be used **without the Automatic Pilot,** an auxiliary resistor-plug assembly P108 (Figure 11, item 1) is required for use in receptacle J106 in place of plug P106 of cable W505, as noted on Figure 3.

2.24 BATTERY INPUT—The d-c primary power source for the altimeter equipment should be a battery of the required nominal voltage—24 volts for AYD-3 and ★AN/ARN-1 (27 V.) or 12 volts for ★AN/ARN-1 (13.5 V.)—which preferably should be operated with a suitable engine-driven generator and voltage regulator adjusted to supply the normal rated input voltage (27 or 13.5 volts) at the Radio Transmitter-Receiver **when operating.** The Battery Input cable is not supplied with the AYD Series or ★AN/ARN-1 equipments. Instructions for making the required connections, indicated in the upper right inset on Figure 3, will be issued separately by the Navy Department, Bureau of Aeronautics. In general, the Battery Input cable should be as short as possible and should run directly to the voltage source, to prevent excessive voltage drop. The resistance of the cable should not exceed 0.05 ohm **for 13.5 volt models.** The Battery Input cable should be disconnected from receptacle J103 at the Radio Transmitter-Receiver while connections are being made to the power source. **Care must be taken to insure proper polarity (negative ground, as indicated) or damage to the equipment may result. MAKE SURE THAT THE INPUT VOLTAGE RATING OF THE RADIO TRANSMITTER-RECEIVER (ALSO THAT OF THE ALTITUDE LIMIT INDICATOR AND THE AUTOMATIC PILOT, WHEN USED) CORRESPONDS TO THE BATTERY INPUT VOLTAGE, BEFORE CONNECTING TO THE BATTERY INPUT RECEPTACLE J103.**

INSTALLATION ADJUSTMENTS

2.25 GENERAL—As stated in the "IMPORTANT" notice following paragraph 2.2, the Radio Transmitter-Receiver must be laboratory adjusted for the residual altitude of the particular installation. When this has been done and the

* Navy Type No. CSX-49192, manufactured by Selectar Manufacturing Corporation—Do not use adapters of this type made by any other manufacturer.

** Note that P109 for AYD-3 and ★AN/ARN-1 is a five-pin plug and is not interchangeable with the one for AYD and AYD-2 (Figure 11, item 7) which has four pins and requires short-circuit or switch connection across terminals B and C.

equipment has been carefully installed in accordance with the foregoing instructions, the AYD Series or ★AN/ARN-1 equipments normally require no further routine adjustments. However, before being placed in service, the equipment should be checked by a trained maintenance man and if necessary adjusted to insure proper functioning. (Comprehensive instructions for all adjustments are contained in the Maintenance Manual.) For purposes of the following tests, both an Altitude Indicator and an Altitude Limit Indicator should be temporarily, if not permanently, installed and connected to the Radio Transmitter-Receiver. **DO NOT PROCEED UNTIL YOU ARE THOROUGHLY FAMILIAR WITH THE OPERATION OF THE EQUIPMENT AS DESCRIBED IN SECTION III.**

2.26 ALTITUDE INDICATOR—As mentioned in paragraph 2.5, the meter pointer normally rests in a sub-zero position when the equipment is not energized. This unit has been so adjusted at the factory that a direct current of 1.5 milliamperes (applied through terminals D-E of the rear connector) will cause the pointer to assume the zero position of the scale. **DO NOT DISTURB THIS SUB-ZERO ADJUSTMENT.**

2.27 When the airplane is standing still or taxiing, the Altitude Indicator may not read zero, with the equipment operating. This may be due to spurious reflections from nearby objects and does not necessarily indicate improper calibration of the equipment. The zero altitude calibration is best checked upon landing by noting the reading of the Altitude Indicator at the instant of contact of the landing gear—see paragraph 2.31 (e).

2.28 AUTOMATIC PILOT—Complete instructions for adjusting the automatic pilot equipment are to be provided by the Navy Department, Bureau of Aeronautics. **See "IMPORTANT" note (2) under the heading "INSTALLATION" at the beginning of this section.**

2.29 When the installation includes the automatic pilot equipment, a careful check should be made on the ground, before proceeding with the flight test, to make sure that when flying BELOW the altitude determined by the setting of the Altitude Limit Switch, the automatic pilot will INCREASE the altitude. The opposite response would naturally result in a crash unless prevented by prompt action of the pilot in manually taking over control of the aircraft. This check should be performed by qualified maintenance personnel according to instructions contained in the "AYD-3 and ★AN/ARN-1" (also "AYD and AYD-2") Maintenance Manual.

2.30 FLIGHT TESTS—A short initial flight test of the altimeter equipment **alone** is desirable for checking its overall operation and the calibration of both the Altitude Indicator and the Altitude Limit channels. Accurate performance of the altimeter when used with the automatic pilot is dependent upon the Altitude Limit channel being correctly calibrated within the required limits. The aircraft should be equipped for test purposes with a barometric altimeter which can be accurately adjusted and calibrated to indicate "absolute" altitude **with reference to the water or level terrain over which the test is to be conducted.** If possible, avoid making the flight tests under extremely rough or "bumpy" air conditions.

2.31 Altimeter Calibration Check—For this test it is highly desirable that the resistor-plug assembly P108 (Figure 11), be inserted in receptacle J106 in place of plug P106 of the Automatic Pilot cable W505 (Figure 3). However, if one of these auxiliary plugs is not available, the test can be performed by alternative means (if the installation includes the automatic pilot equipment) as explained in the Maintenance Manual for "AYD-3 and ★AN/ARN-1" (also "AYD and AYD-2"). After the barometric altimeter adjustment has been made, proceed as follows:

(a) Turn the power switch on the Altitude Indicator to the "on" position. Allow a minute or two for the tubes to heat and for the pointer to deflect from its sub-zero position (see paragraphs 2.26 and 2.27). **MAKE SURE THAT THE CHANGEOVER CONTROL—SEE PARAGRAPH 3.1 (c)—IS SET FOR MANUAL OPERATION.**

(b) After take-off, climb until the calibrated barometric altimeter indicates an altitude intermediate between the upper scale limits of the Altitude Limit Switch and the Altitude Indicator. While maintaining this altitude over the smooth water or level unobstructed ground chosen for the test, note the Altitude Indicator deflection, which should agree approximately with that of the barometric altimeter.

(c) Continuing the flight over the test terrain, climb gradually and note the lowest barometric altimeter reading at which the Altitude Indicator pointer "falls out", that is, fails to sustain full deflection against the upper stop. This should be not less than 250 percent over water (or 150 percent over land) of the full scale reading of the Altitude Indicator.

(d) With the aircraft in flight over reasonably smooth water or level unobstructed ground (not necessarily the previously chosen test terrain), check the Altitude Limit Indicator signals for each altitude setting of the Altitude Limit Switch. (During this check, no comparison with the barometric altimeter indications is required.) At any step of altitude, the "on altitude" signal (white light in the indicator system suggested on Figure 3) should be obtained when the corresponding altitude, approximately, is indicated by the Altitude Indicator. The "low" and

"high" signals (red and green, respectively, in Figure 3) should appear at altitude indications slightly below and above the nominal altitude for which the Altitude Limit Switch is set. (See paragraph 3.7.)

(e) When preparing to land, carefully observe the Altitude Indicator deflection. If the Radio Transmitter-Receiver is correctly calibrated, the pointer should indicate approximately zero altitude at the instant of contact of the landing gear.

2.32 If the required accuracy of calibration was not obtained throughout the preceding test, reference should be made to the Maintenance Manual for further instructions before proceeding.

IMPORTANT—Do not tamper with the "CALIBRATION," "ALTITUDE INDICATOR ZERO ADJ." or "ALTITUDE LIMIT ADJ." screwdriver adjustments (Figure 4) after the equipment has been calibrated.

2.33 Test of Operation with Automatic Pilot— If the results of the altimeter calibration check were satisfactory as to calibration and performance of the altimeter equipment, another flight test should be made to check the overall performance with the automatic pilot system (when the latter is included in the installation). This test should be conducted over level unobstructed terrain or over water, and should be performed only by qualified personnel in accordance with the recommended procedure outlined in the Maintenance Manual. If the altimeter calibration flight check was made with the resistor-plug assembly P108 inserted in receptacle J106 as recommended, step (d) of paragraph 2.31 should be repeated while flying manually (change-over control set for manual operation) with the altimeter connected to the automatic pilot. Such other tests as may be specified by the Navy Department, Bureau of Aeronautics, depending upon the type of service anticipated for the particular installation, should be performed.

2.34 If any difficulties were encountered during the test of the altimeter with the automatic pilot, reference should be made to the Maintenance Manual and to the instructions issued by the Navy Department, Bureau of Aeronautics, for corrective measures.

III

OPERATION

CAUTION—OPERATING PERSONNEL ARE NOT TO DISTURB ANY OF THE SCREWDRIVER ADJUSTMENTS ON THE FRONT PANEL OF THE RADIO TRANSMITTER-RECEIVER. THESE ADJUSTMENTS ARE ACCESSIBLE EXTERNALLY ONLY FOR THE CONVENIENCE OF QUALIFIED INSTALLATION OR MAINTENANCE PERSONNEL WHEN CALIBRATING THE EQUIPMENT.

3.1 CONTROLS—The controls used for operating the AYD Series and ★AN/ARN-1 altimeter equipments are as follows:

(a) **Power Switch**—This switch controls the battery input to the Radio Transmitter-Receiver, which includes the output currents from the Automatic Pilot and Altitude Limit Indicator receptacles. The power switch, S201 (see Figures 3 and 5), is included in the Altitude Indicator. If the Altitude Indicator is omitted from the installation, the auxiliary plug P109 (Figures 3 and 11) must be used to complete the battery input circuit as explained in paragraph 2.23.

(b) **Altitude Limit Switch**—The setting of this control, E301 (see Figures 3 and 6), determines the altitude at which the Radio Transmitter-Receiver operates the Altitude Limit Indicator (see paragraph 3.7). Its setting also determines the operation of the altimeter when used with the automatic pilot.

(c) **Manual-Automatic Changeover Control**—This control, not supplied with the AYD Series or ★AN/ARN-1 altimeter equipments, is required in installations which include the automatic pilot. Detailed instructions for manipulation of this control (or combination of controls) are to be supplied by the Navy Department, Bureau of Aeronautics.

3.2 The adjustment screws marked "CALIBRATION ADJUSTMENT," "ALTITUDE INDICATOR ZERO ADJ." and "ALTITUDE LIMIT ADJ." (see Figure 4) are **not** operating controls and their settings must **not** be changed by the operator after they have been adjusted by qualified installation or maintenance personnel. **See "CAUTION" notice at the beginning of this section.**

CAUTION—WHEN IN FLIGHT, IF THE INSTALLATION INCLUDES THE AUTOMATIC PILOT SYSTEM, ALWAYS MAKE SURE THAT THE CHANGEOVER CONTROL IS IN THE MANUAL OPERATING POSITION BEFORE APPLYING POWER TO THE ALTIMETER EQUIPMENT.

3.3 STARTING PROCEDURE—To commence operation, turn the power switch (on the Altitude Indicator, or separate switch connected to P109—see paragraph 3.1) to the "on" position, or insert the auxiliary plug P109 (with terminals A and B short-circuited) in the Altitude Indicator receptacle J104 (see Figure 3). After allowing one minute for the tubes to heat, observe that the pointer of the Altitude Indicator (if used) has moved from its sub-zero stop position to some other position, indicating that the equipment is energized.

IMPORTANT—When the aircraft is resting on the ground, the Altitude Indicator pointer may not indicate zero altitude. NEVER ATTEMPT TO ADJUST THE EQUIPMENT TO OBTAIN A ZERO READING FOR THIS CONDITION. See paragraphs 2.26 and 2.27.

3.4 ALTITUDE INDICATIONS—True indications of altitude, over the entire range of the equipment, should be given by the Altitude Indicator **after take-off.** Some fluctuation may be noticed in the Altitude Indicator reading when flying over rough or uneven terrain, or when flying through bumpy air. At altitudes considerably above the upper limit of range of the equipment, the Altitude Indicator pointer may be expected to fall back from its full stop position, as mentioned in paragraph 2.31(c).

3.5 OPERATION WITH AUTOMATIC PILOT—When the Radio Transmitter-Receiver is connected through cable W505 to a suitable automatic pilot system (see Figure 3), the AYD Series or ★AN/ARN-1 altimeter equipment can be used to maintain a flight altitude corresponding to any of the altitude steps marked on the scale of the Altitude Limit Switch. The installation with automatic pilot will normally include a changeover control—see paragraph 3.1(c)—which will permit the pilot to fly the airplane manually without opposition from the automatic pilot. However, if the automatic pilot system permits, the pilot can take over control manually, in case of emergency, without disconnecting the system. Some loss of altitude may be expected while executing a steep banked turn when the automatic pilot is operated with the altimeter.

CAUTION—When flying above the control range of the altimeter equipment (highest altitude marked on the Altitude Limit Switch), or when preparing to land, the changeover control should be set in the position for MANUAL operation. Manual operation should be used also when flying at low altitude over rough or obstructed terrain or in abnormally bumpy air. STUNT FLY-

ING SHOULD NEVER BE ATTEMPTED WITH THE CHANGEOVER CONTROL IN THE AUTOMATIC POSITION.

3.6 WARNING—WHEN FLYING WITH THE AUTOMATIC PILOT, THE PILOT SHOULD AT ALL TIMES BE PREPARED TO TAKE OVER CONTROL MANUALLY. While all reasonable safeguards have been taken in the design and manufacture of the AYD Series and ★AN/-ARN-1 altimeter equipments, certain types of electrical failures are possible which may interfere with proper operation and hence require prompt action of the pilot in assuming manual control. For safety reasons, the equipment has been so designed that the type of faults **most likely to occur** will cause the aircraft to **climb** at the maximum angle for which the system is adjusted. However, other possible failures may cause the aircraft to **dive** at the maximum control angle. A third type of fault (which includes a fuse burnout or power failure) will result in interruption of control without an accompanying change in the **attitude** (pitch angle) which exists at the instant of failure. In general, the pilot will be warned immediately of such failures by inconsistent or interrupted indications of the Altitude Indicator and the Altitude Limit Indicator—see paragraphs 3.4 and 3.7.

3.7 ALTITUDE LIMIT INDICATOR—When included in the installation, this auxiliary device (not supplied with the AYD Series or ★AN/ARN-1 altimeter equipments) relieves the pilot of constant attention to the Altitude Indicator scale. As suggested in the upper left inset of Figure 3, it may consist of three colored lamps, one of which is illuminated for each of the three conditions of relay contact operation. If the suggested colored light system is used, the information provided by the Altitude Limit Indicator is as follows:

(a) **When Used Without Automatic Pilot**—The following lamp signals are obtained, either with the auxiliary plug P108 inserted in J106 (as required when the installation does not include the automatic pilot system) or with J106 connected through cable W505 to the automatic pilot (when the latter has been "centered" by setting the changeover control for MANUAL operation):

(1) **Red**—Indicates flight **below** the (preset) altitude range determined by the Altitude Limit Switch setting.

(2) **White**—Indicates flight **on** the preset altitude range.

(3) **Green**—Indicates flight **above** the preset altitude range.

(b) **When Used With Automatic Pilot**—The Altitude Limit Indicator signals will normally vary quite rapidly during operation with automatic pilot and will at every instant indicate the nature of the **attitude (or pitch) correction,** as follows:

(1) **Red**—Upward correction of attitude.

(2) **White**—No change of attitude.

(3) **Green**—Downward correction of attitude.

A **steady** red (or green) signal normally indicates that **maximum** upward (or downward) correction is being applied because the plane's altitude is not within **two steps** of the Altitude Limit Switch setting. A **steady** white signal indicates that the altitude is within the range for which the Altitude Limit Switch is set. Alternating **green and white** flashes indicate **diminishing upward** or **increasing downward** attitude. Alternating **red and white** flashes indicate **diminishing downward** or **increasing upward** attitude.

3.8 FUSES—The AYD Series and ★AN/ARN-1 altimeter equipments are protected against damage from short-circuits by a fuse (of six-ampere rating for 13.5-volt models and three-ampere rating for 27-volt models) located at the lower right-hand corner of the front panel of the Radio Transmitter-Receiver, Figure 4. A spare fuse of corresponding rating is provided in an adjacent receptacle.

IMPORTANT—If necessary to make any substitution for the fuses (type 4AG Littelfuse) which are supplied with the equipment and spare parts, use "slow-blowing" fuses of the same current capacity if available. If not available, substitute fuses of the next higher current rating **for temporary emergency use only.**

3.9 MAINTENANCE—The altimeter equipment should be checked periodically for performance and accuracy of calibration by qualified maintenance personnel. If at any time the altimeter indications appear inconsistent or seem to fluctuate abnormally, or if operation with the automatic pilot should become erratic, the proper maintenance personnel should be notified. In event of failure to operate, first check for a burned-out fuse, make sure that all cable connections are tight, and that normal battery voltage is being delivered to the equipment. If the trouble is not thus remedied, it is suggested that another Radio Transmitter-Receiver unit of the same type and voltage rating (which has been calibrated for the correct residual altitude—see paragraph 2.2, "IMPORTANT") be substituted in order to determine whether the trouble is in this unit or in another part of the equipment. Comprehensive servicing instructions are contained in the Maintenance Manual.

MODELS AYD-3 (27 V. D-C) AND ★AN/ARN-1 (27 V., 13.5 V. D-C)

SIMILAR TO MODELS AYD (13.5 V.) AND AYD-2 (27 V.) SHOWN ON DWG. P-255275, WITH THE FOLLOWING DIFFERENCES:

(1) 50 OHM INSTEAD OF 72 OHM R-F TRANSMISSION SYSTEM,

(2) 5-PIN INSTEAD OF 4-PIN ALTITUDE INDICATOR SYSTEM.

BECAUSE OF THESE DIFFERENCES, THE RADIO TRANSMITTER-RECEIVER, ANTENNAS, ALTITUDE INDICATOR, ANTENNA TRANSMISSION LINES AND ALTITUDE INDICATOR CABLE ARE NOT INTERCHANGEABLE WITH CORRESPONDING AYD AND AYD-2 ITEMS.

CAUTION– IF ALTITUDE LIMIT INDICATOR IS TO BE USED WITH AUTOMATIC PILOT, COMMON LEAD OF INDICATOR MUST BE CONNECTED DIRECTLY TO GROUND WITHOUT SERIES RESISTANCE. DROPPING RESISTORS OR BRILLIANCE CONTROLS, IF REQUIRED, MUST BE INSERTED SEPARATELY IN EACH OF THREE INDICATOR LEADS, AS SHOWN IN FIG. A. THE ARRANGEMENT SHOWN IN FIG. B IS PERMISSIBLE ONLY FOR INSTALLATIONS WITHOUT AUTOMATIC PILOT.

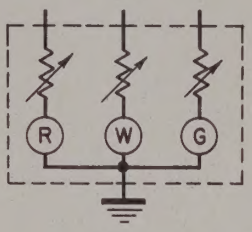


FIG. A
CORRECT FOR USE WITH OR WITHOUT AUTOMATIC PILOT

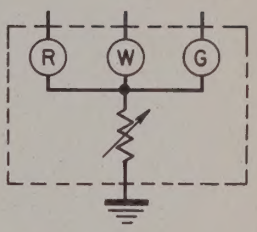


FIG. B
MUST NOT BE USED WITH AUTOMATIC PILOT

LIST OF MAJOR UNITS AND ACCESSORIES

FOR AYD-3 AND ★AN/ARN-1 AIRCRAFT RADIO ALTIMETER EQUIPMENTS

ITEM NO.	QUANTITY PER EQUIPMENT: NXs-6722:CDL AYD-3 27 V.	NXs-6722:CDL ★AN/ARN-1 27 V.	NXs-6722:CDL ★AN/ARN-1 13.5 V.	NXs-2424:CRV ★AN/ARN-1 27 V.	NXs-2424:CRV ★AN/ARN-1 13.5 V.	ANB DESIGNATION OR NAVY TYPE DESIGNATION	NAVY TYPE NUMBER	SYMBOL GROUP OR NUMBERS	NAME	RCA DRAWING NUMBER	OUTLINE DRAWING NUMBER
1	1					CDL-43039	43039	101 - 199	RADIO TRANSMITTER-RECEIVER (LESS SHOCK MOUNTING ASSEMBLY)	K-251430-506	P-255248-1
2		1				★RT-3A/ARN-1				K-251430-506	P-255248-2
3			1			★RT-2A/ARN-1				K-252646-502	P-255248-3
4				1		★RT-3/ARN-1				K-251430-505	P-255248-4
5					1	★RT-2/ARN-1				K-252646-501	P-255248-5
6	1	1	1	1	1	★MT-14/ARN-1		A101	SHOCK MOUNTING ASSEMBLY	T-256002-501	P-255248-6
7	1 ●	1	1	1	1	★ID-1/ARN-1		201 - 299	ALTITUDE INDICATOR	P-255072-504 OR P-255254-501	M-253155
8	1	1	1	1	1	★SA-1/ARN-1	24130	301 - 399	ALTITUDE LIMIT SWITCH	P-255295-501	M-253607
9	2					CDL-66083	66083	E401, E402	ANTENNA ASSEMBLY	P-255327-502	K-252401
10		2	2	2	2	★AT-4/ARN-1				P-255327-501	
11	1	1	1	1	1			W501	REC. ANT. TRANSMISSION LINE ASSY. ●●	OUTLINE-ASSY.	P-255246-1
12	1	1	1	1	1			W502	TRANS. ANT. TRANSMISSION LINE ASSY. ●●	OUTLINE-ASSY.	P-255246-2
13	50 FT.	100 FT.	100 FT.	100 FT.	100 FT.		CASSF-50-1	W501A, 502A	50 OHM COAXIAL TRANSMISSION LINE	K-871757-2	P-255246-3
14	4	4	4	4	4		CSX-49192 △	E507, 508, 509, 510	COAXIAL ELBOW ADAPTER	K-252666-1	P-255246-7
15	1							W503	ALTITUDE INDICATOR CABLE ASSY. ●●	OUTLINE-ASSY.	P-255243-1A
		1	1	1	1					OUTLINE-ASSY.	P-255243-1B
16	25 FT.							W503A	4-WIRE SHIELDED CABLE	M-253128-1	P-255243-4
17		30 FT.	30 FT.	30 FT.	30 FT.				5-WIRE SHIELDED CABLE	M-253128-3	P-255243-4A
18	1	1	1	1	1			W504	ALT. LIM. SWITCH CABLE ASSY. ●●	OUTLINE-ASSY.	P-255243-2
19	25 FT.	30 FT.	30 FT.	30 FT.	30 FT.			W504A	5-WIRE SHIELDED CABLE	M-253128-2	P-255243-5
20	1	X	X	X	X			W505	AUTOMATIC PILOT CABLE ASSY. ●●	OUTLINE-ASSY.	P-255243-3
21	8 FT.	X	X	X	X			W505A	7-WIRE SHIELDED CABLE	M-253033-1	P-255243-6
22	1	1	1	1	1			P103	PLUG (BATTERY INPUT)	P-255073-52	P-255243-7
23	1 ●	1	1	1	1			P105	PLUG (ALTITUDE LIMIT INDICATOR)	P-255073-51	P-255243-9
24	1 ●	1	1	1	1			P108	RESISTOR PLUG ASSEMBLY	K-251872-501	P-255321-1
25	1							P109	AUXILIARY PLUG	P-255262-48	P-255321-9
26	1							E506	CAP (FOR P109)	K-251728-2	P-255321-8

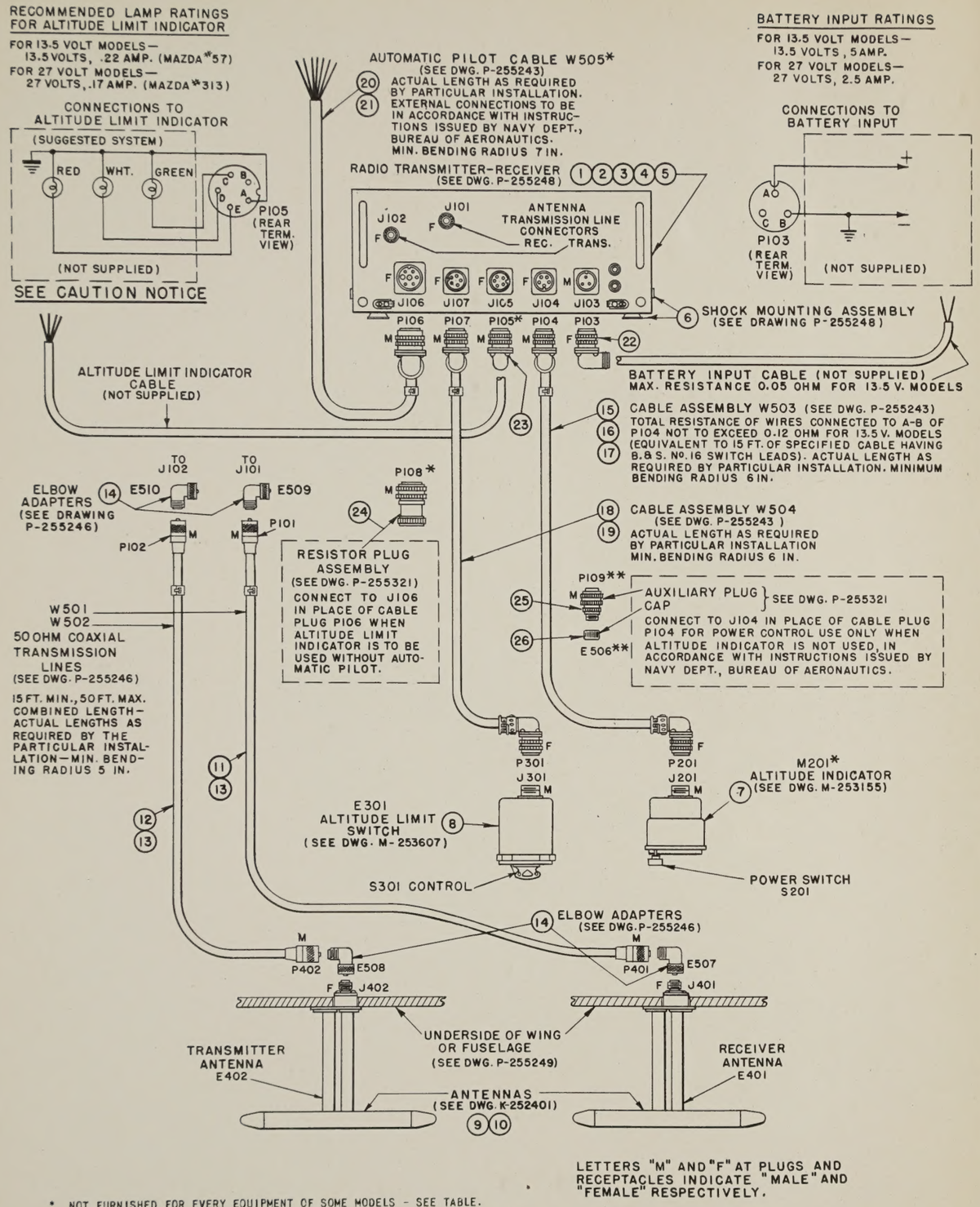
X LIMITED QUANTITIES SUPPLIED IN BULK AS SPECIFIED BY CONTRACT.

● SUPPLIED WITH PERCENTAGE OF EQUIPMENTS AS SPECIFIED BY CONTRACT.

●● CABLE COMPONENTS FURNISHED IN BULK AS SPECIFIED ON OUTLINE-ASSEMBLY DRAWING.

△ MANUFACTURED BY SELECTAR MFG. CORP. – DO NOT SUBSTITUTE NAVY TYPE NO. 49192 ADAPTER OF ANY OTHER MAKE.

Figure 3—AYD-3 and ★ AN/ARN-1 Altimeter Equipments—Interconnection Diagram (Dwg. P-255247)


RECOMMENDED LAMP RATINGS FOR ALTITUDE LIMIT INDICATOR
FOR 13.5 VOLT MODELS— 13.5 VOLTS, .22 AMP. (MAZDA*57)
FOR 27 VOLT MODELS— 27 VOLTS, .17 AMP. (MAZDA*313)
CONNECTIONS TO ALTITUDE LIMIT INDICATOR
(SUGGESTED SYSTEM)
RED
WHT.
GREEN
P105 (REAR TERM. VIEW)
(NOT SUPPLIED)
SEE CAUTION NOTICE
AUTOMATIC PILOT CABLE W505* (SEE DWG. P-255243)
ACTUAL LENGTH AS REQUIRED BY PARTICULAR INSTALLATION. EXTERNAL CONNECTIONS TO BE IN ACCORDANCE WITH INSTRUCTIONS ISSUED BY NAVY DEPT., BUREAU OF AERONAUTICS. MIN. BENDING RADIUS 7 IN.
RADIO TRANSMITTER-RECEIVER (SEE DWG. P-255248)
J102
J101
ANTENNA TRANSMISSION LINE CONNECTORS
REC.
TRANS.
J106
J107
J105
J104
J103
P106
P107
P105*
P104
P103
BATTERY INPUT RATINGS
FOR 13.5 VOLT MODELS— 13.5 VOLTS, 5 AMP.
FOR 27 VOLT MODELS— 27 VOLTS, 2.5 AMP.
CONNECTIONS TO BATTERY INPUT
P103 (REAR TERM. VIEW)
(NOT SUPPLIED)
SHOCK MOUNTING ASSEMBLY (SEE DRAWING P-255248)
BATTERY INPUT CABLE (NOT SUPPLIED) MAX. RESISTANCE 0.05 OHM FOR 13.5 V. MODELS
ALTITUDE LIMIT INDICATOR CABLE (NOT SUPPLIED)
CABLE ASSEMBLY W503 (SEE DWG. P-255243)
TOTAL RESISTANCE OF WIRES CONNECTED TO A-B OF P104 NOT TO EXCEED 0.12 OHM FOR 13.5 V. MODELS (EQUIVALENT TO 15 FT. OF SPECIFIED CABLE HAVING B. & S. NO. 16 SWITCH LEADS). ACTUAL LENGTH AS REQUIRED BY PARTICULAR INSTALLATION. MINIMUM BENDING RADIUS 6 IN.
TO J102
TO J101
ELBOW ADAPTERS (SEE DRAWING P-255246)
E510
E509
P102
P101
P108*
RESISTOR PLUG ASSEMBLY (SEE DWG. P-255321)
CONNECT TO J106 IN PLACE OF CABLE PLUG P106 WHEN ALTITUDE LIMIT INDICATOR IS TO BE USED WITHOUT AUTOMATIC PILOT.
CABLE ASSEMBLY W504 (SEE DWG. P-255243)
ACTUAL LENGTH AS REQUIRED BY PARTICULAR INSTALLATION MIN. BENDING RADIUS 6 IN.
P109**
AUXILIARY PLUG CAP } SEE DWG. P-255321
CONNECT TO J104 IN PLACE OF CABLE PLUG P104 FOR POWER CONTROL USE ONLY WHEN ALTITUDE INDICATOR IS NOT USED, IN ACCORDANCE WITH INSTRUCTIONS ISSUED BY NAVY DEPT., BUREAU OF AERONAUTICS.
E506**
W501
W502
50 OHM COAXIAL TRANSMISSION LINES (SEE DWG. P-255246)
15 FT. MIN., 50 FT. MAX. COMBINED LENGTH— ACTUAL LENGTHS AS REQUIRED BY THE PARTICULAR INSTALLATION—MIN. BENDING RADIUS 5 IN.
P301
J301
P201
J201
M201* ALTITUDE INDICATOR (SEE DWG. M-253155)
E301 ALTITUDE LIMIT SWITCH (SEE DWG. M-253607)
S301 CONTROL
POWER SWITCH S201
ELBOW ADAPTERS (SEE DWG. P-255246)
P402
E508
P401
E507
J402
J401
UNDERSIDE OF WING OR FUSELAGE (SEE DWG. P-255249)
TRANSMITTER ANTENNA E402
RECEIVER ANTENNA E401
ANTENNAS (SEE DWG. K-252401)
LETTERS "M" AND "F" AT PLUGS AND RECEPTACLES INDICATE "MALE" AND "FEMALE" RESPECTIVELY.

* NOT FURNISHED FOR EVERY EQUIPMENT OF SOME MODELS - SEE TABLE.

** NOT FURNISHED WITH SOME MODELS - SEE TABLE.

MODELS AYD-3 (27 V. D-C) AND ★AN/ARN-1 (27 V., 13.5 V. D-C)

SIMILAR TO MODELS AYD (13.5 V.) AND AYD-2 (27 V.) SHOWN ON DWG. P-255275, WITH THE FOLLOWING DIFFERENCES:
(1) 50 OHM INSTEAD OF 72 OHM R-F TRANSMISSION SYSTEM,
(2) 5-PIN INSTEAD OF 4-PIN ALTITUDE INDICATOR SYSTEM.
BECAUSE OF THESE DIFFERENCES, THE RADIO TRANSMITTER-RECEIVER, ANTENNAS, ALTITUDE INDICATOR, ANTENNA TRANSMISSION LINES AND ALTITUDE INDICATOR CABLE ARE NOT INTERCHANGEABLE WITH CORRESPONDING AYD AND AYD-2 ITEMS.

CAUTION— IF ALTITUDE LIMIT INDICATOR IS TO BE USED WITH AUTOMATIC PILOT, COMMON LEAD OF INDICATOR MUST BE CONNECTED DIRECTLY TO GROUND WITHOUT SERIES RESISTANCE. DROPPING RESISTORS OR BRILLIANCE CONTROLS, IF REQUIRED, MUST BE INSERTED SEPARATELY IN EACH OF THREE INDICATOR LEADS, AS SHOWN IN FIG. A. THE ARRANGEMENT SHOWN IN FIG. B IS PERMISSIBLE ONLY FOR INSTALLATIONS WITHOUT AUTOMATIC PILOT.

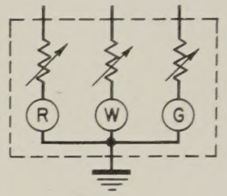


FIG. A
CORRECT FOR USE WITH OR WITHOUT AUTOMATIC PILOT

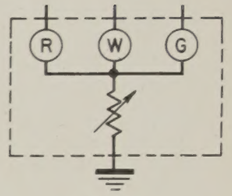


FIG. B
MUST NOT BE USED WITH AUTOMATIC PILOT

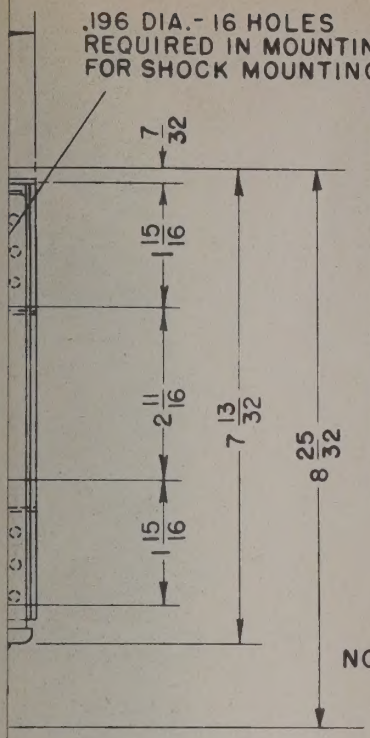
LIST OF MAJOR UNITS AND ACCESSORIES

FOR AYD-3 AND ★AN/ARN-1 AIRCRAFT RADIO ALTIMETER EQUIPMENTS

ITEM NO.	QUANTITY PER EQUIPMENT NXs-6722:CDL AYD-3 27 V.	NXs-6722:CDL ★AN/ARN-1 27 V.	NXs-6722:CDL ★AN/ARN-1 13.5 V.	NXs-2424:CRV ★AN/ARN-1 27 V.	NXs-2424:CRV ★AN/ARN-1 13.5 V.	ANB DESIGNATION OR NAVY TYPE DESIGNATION	NAVY TYPE NUMBER	SYMBOL GROUP OR NUMBERS	NAME	RCA DRAWING NUMBER	OUTLINE DRAWING NUMBER
1	1					CDL-43039	43039	101 - 199	RADIO TRANSMITTER-RECEIVER (LESS SHOCK MOUNTING ASSEMBLY)	K-251430-506	P-255248-1
2		1				★RT-3A/ARN-1				K-251430-506	P-255248-2
3			1			★RT-2A/ARN-1				K-252646-502	P-255248-3
4				1		★RT-3/ARN-1				K-251430-505	P-255248-4
5					1	★RT-2/ARN-1				K-252646-501	P-255248-5
6	1	1	1	1	1	★MT-14/ARN-1		A101	SHOCK MOUNTING ASSEMBLY	T-256002-501	P-255248-6
7	1 ●	1	1	1	1	★ID-1/ARN-1		201 - 299	ALTITUDE INDICATOR	P-255072-504 OR P-255254-501	M-253155
8	1	1	1	1	1	★SA-1/ARN-1	24130	301 - 399	ALTITUDE LIMIT SWITCH	P-255295-501	M-253607
9	2					CDL-66083	66083	E401, E402	ANTENNA ASSEMBLY	P-255327-502	K-252401
10		2	2	2	2	★AT-4/ARN-1				P-255327-501	
11	1	1	1	1	1			W501	REC. ANT. TRANSMISSION LINE ASSY. ●●	OUTLINE-ASSY.	P-255246-1
12	1	1	1	1	1			W502	TRANS. ANT. TRANSMISSION LINE ASSY. ●●	OUTLINE-ASSY.	P-255246-2
13	50 FT.	100 FT.	100 FT.	100 FT.	100 FT.		CASSF-50-1	W501A, 502A	50 OHM COAXIAL TRANSMISSION LINE	K-871757-2	P-255246-3
14	4	4	4	4	4		CSX-49192 △	E507, 508, 509, 510	COAXIAL ELBOW ADAPTER	K-252666-1	P-255246-7
15	1							W503	ALTITUDE INDICATOR CABLE ASSY. ●●	OUTLINE-ASSY.	P-255243-1A
		1	1	1	1					OUTLINE-ASSY.	P-255243-1B
16	25 FT.							W503A	4-WIRE SHIELDED CABLE	M-253128-1	P-255243-4
17		30 FT.	30 FT.	30 FT.	30 FT.				5-WIRE SHIELDED CABLE	M-253128-3	P-255243-4A
18	1	1	1	1	1			W504	ALT. LIM. SWITCH CABLE ASSY. ●●	OUTLINE-ASSY.	P-255243-2
19	25 FT.	30 FT.	30 FT.	30 FT.	30 FT.			W504A	5-WIRE SHIELDED CABLE	M-253128-2	P-255243-5
20	1	X	X	X	X			W505	AUTOMATIC PILOT CABLE ASSY. ●●	OUTLINE-ASSY.	P-255243-3
21	8 FT.	X	X	X	X			W505A	7-WIRE SHIELDED CABLE	M-253033-1	P-255243-6
22	1	1	1	1	1			P103	PLUG (BATTERY INPUT)	P-255073-52	P-255243-7
23	1 ●	1	1	1	1			P105	PLUG (ALTITUDE LIMIT INDICATOR)	P-255073-51	P-255243-9
24	1 ●	1	1	1	1			P108	RESISTOR PLUG ASSEMBLY	K-251872-501	P-255321-1
25	1							P109	AUXILIARY PLUG	P-255262-48	P-255321-9
26	1							E506	CAP (FOR P109)	K-251728-2	P-255321-8

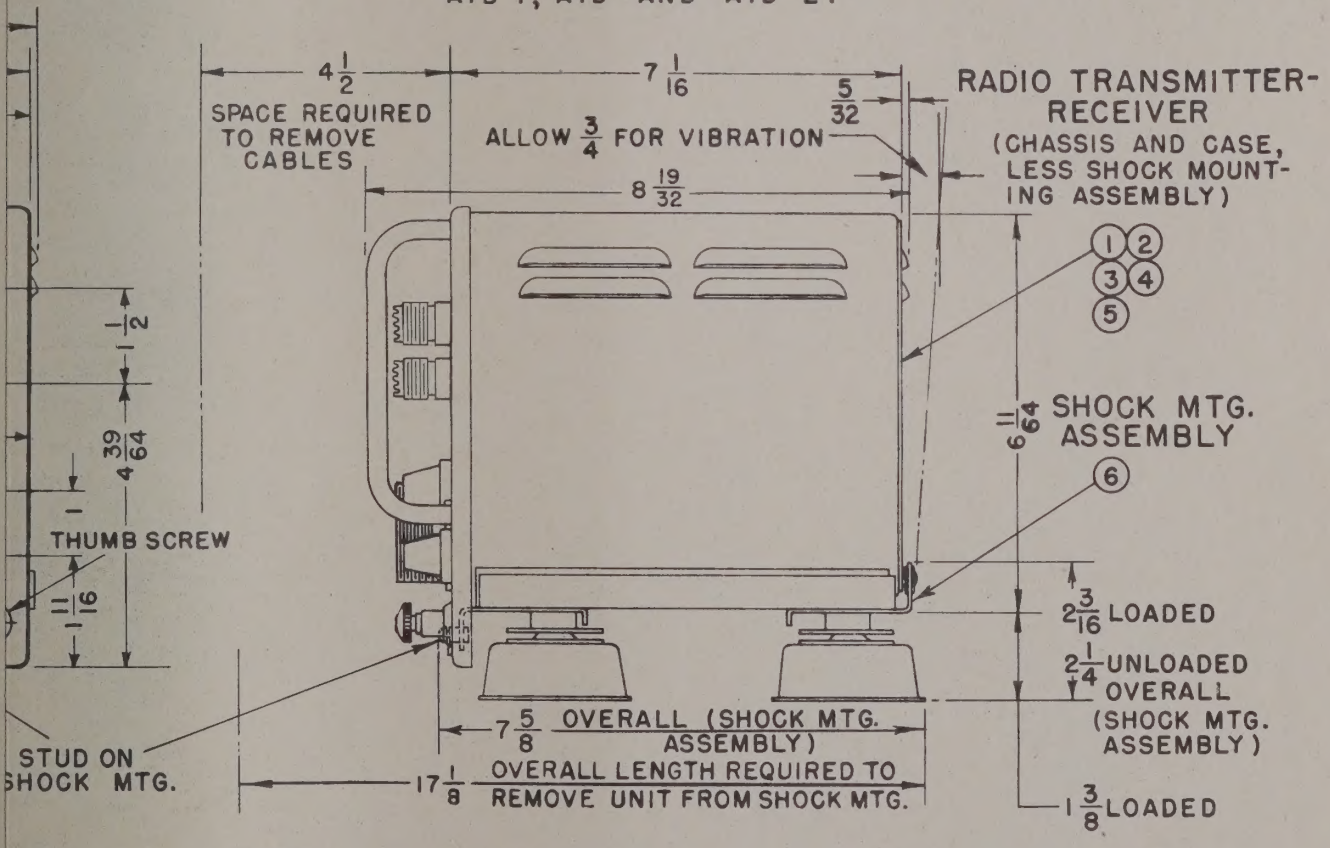
X LIMITED QUANTITIES SUPPLIED IN BULK AS SPECIFIED BY CONTRACT.
● SUPPLIED WITH PERCENTAGE OF EQUIPMENTS AS SPECIFIED BY CONTRACT.
●● CABLE COMPONENTS FURNISHED IN BULK AS SPECIFIED ON OUTLINE-ASSEMBLY DRAWING.
△ MANUFACTURED BY SELECTAR MFG. CORP. - DO NOT SUBSTITUTE NAVY TYPE NO. 49192 ADAPTER OF ANY OTHER MAKE.

Figure 3—AYD-3 and ★ AN/ARN-1 Altimeter Equipments—Interconnection Diagram (Dwg. P-255247)



ITEM NO.	NAVY TYPE NO. OR ANB NO.	VOLTS D.C.	MFR. CODE	EQUIPMENT MODEL NO.	EQUIPMENT DIAGRAM
1	CDL-43039	27	CDL	AYD-3	P-255247
2	★RT-3A/ARN-1	27	CDL	★AN/ARN-1	
3	★RT-2A/ARN-1	13.5			
4	★RT-3/ARN-1	27	CRV		
5	★RT-2/ARN-1	13.5			
6	★MT-14/ARN-1		CDL OR CRV	AYD-3 AND ★AN/ARN-1	

NOTE- ITEMS 1 AND 2 ARE IDENTICAL EXCEPT FOR NAMEPLATE AND ARE INTERCHANGEABLE WITH ITEM 4 EXCEPT FOR DYNAMOTOR BRUSH REPLACEMENT PARTS. ITEMS 3 AND 5 ARE INTERCHANGEABLE EXCEPT FOR DYNAMOTOR BRUSH REPLACEMENT PARTS. ITEM 6 IS IDENTICAL TO SHOCK MOUNTING ASSEMBLY USED FOR MODELS AYB-1, AYD AND AYD-2.

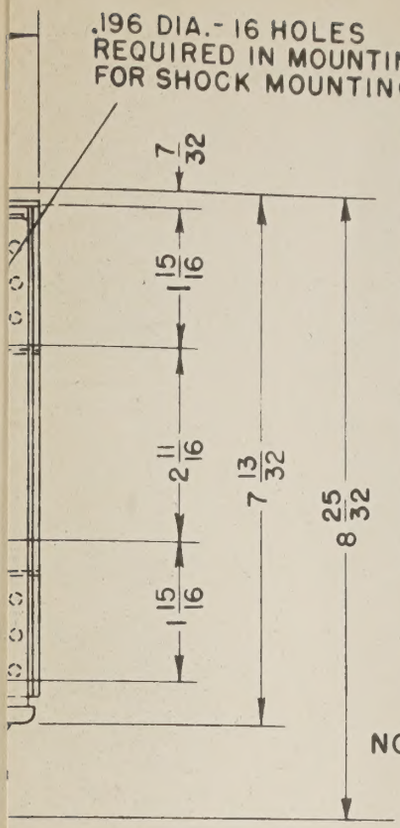


NOTE:
TO REMOVE CHASSIS AND CASE FROM SHOCK MOUNTING, LOOSEN SNAP FASTENERS, PULL UNIT FORWARD 1 INCH AND LIFT 1/2 INCH TO CLEAR ANGLES ON SHOCK MOUNTING.

TO REMOVE CHASSIS FROM CASE AND SHOCK MOUNTING, LOOSEN THUMB SCREWS AND PULL CHASSIS FORWARD 7 INCHES.

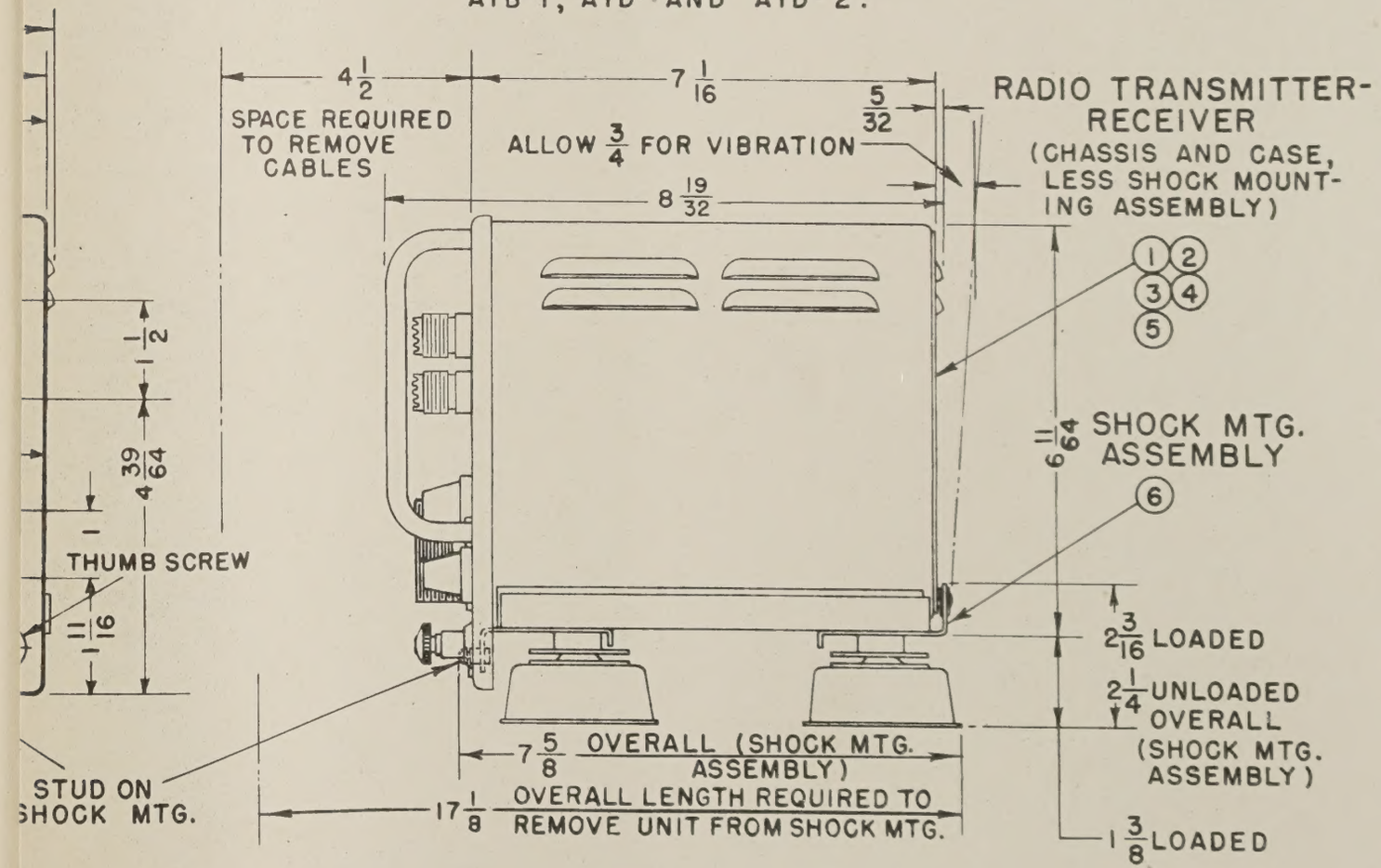
ASSEMBLY

Figure 4—Radio Transmitter-Receiver—Outline (Dwg. P-255248)



ITEM NO.	NAVY TYPE NO. OR ANB NO.	VOLTS D.C.	MFR. CODE	EQUIPMENT MODEL NO.	EQUIPMENT DIAGRAM
1	CDL-43039	27	CDL	AYD-3	P-255247
2	★RT-3A/ARN-1	27	CDL	★AN/ARN-1	
3	★RT-2A/ARN-1	13.5			
4	★RT-3/ARN-1	27	CRV		
5	★RT-2/ARN-1	13.5			
6	★MT-14/ARN-1		CDL OR CRV	AYD-3 AND ★AN/ARN-1	

NOTE- ITEMS 1 AND 2 ARE IDENTICAL EXCEPT FOR NAMEPLATE AND ARE INTERCHANGEABLE WITH ITEM 4 EXCEPT FOR DYNAMOTOR BRUSH REPLACEMENT PARTS. ITEMS 3 AND 5 ARE INTERCHANGEABLE EXCEPT FOR DYNAMOTOR BRUSH REPLACEMENT PARTS. ITEM 6 IS IDENTICAL TO SHOCK MOUNTING ASSEMBLY USED FOR MODELS AYB-1, AYD AND AYD-2.

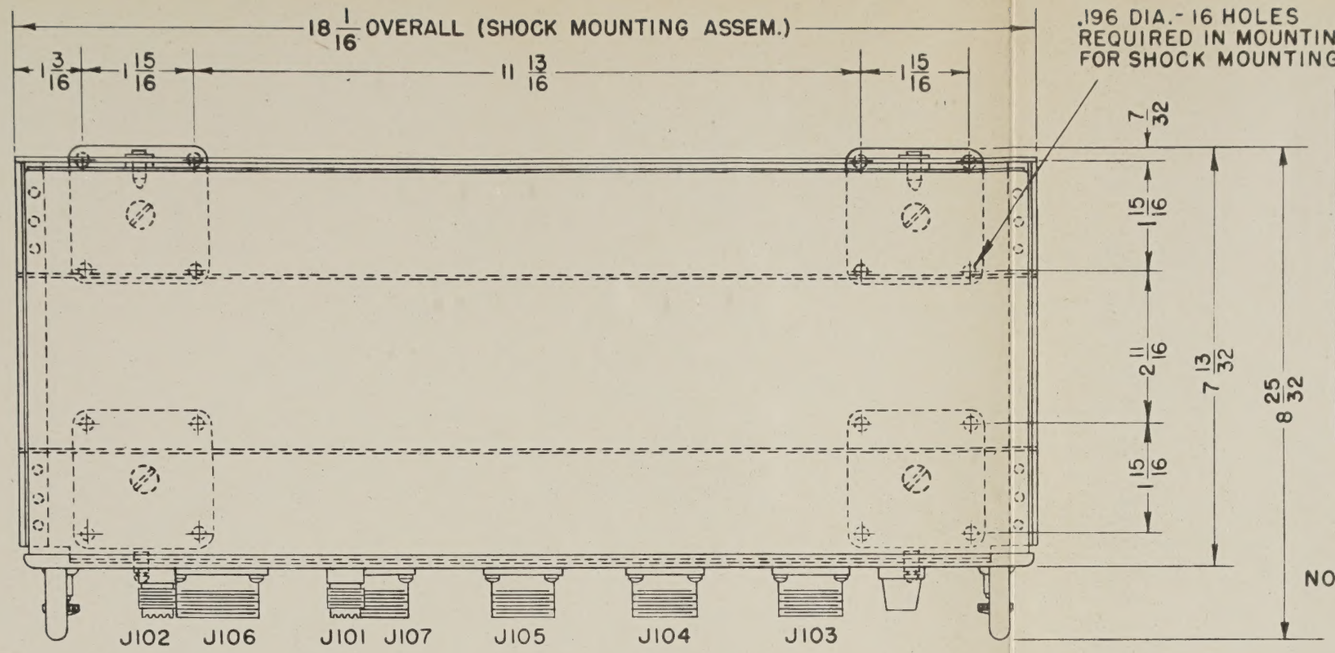


NOTE:
TO REMOVE CHASSIS AND CASE FROM SHOCK MOUNTING, LOOSEN SNAP FASTENERS, PULL UNIT FORWARD 1 INCH AND LIFT 1/2 INCH TO CLEAR ANGLES ON SHOCK MOUNTING.

TO REMOVE CHASSIS FROM CASE AND SHOCK MOUNTING, LOOSEN THUMB SCREWS AND PULL CHASSIS FORWARD 7 INCHES.

ASSEMBLY

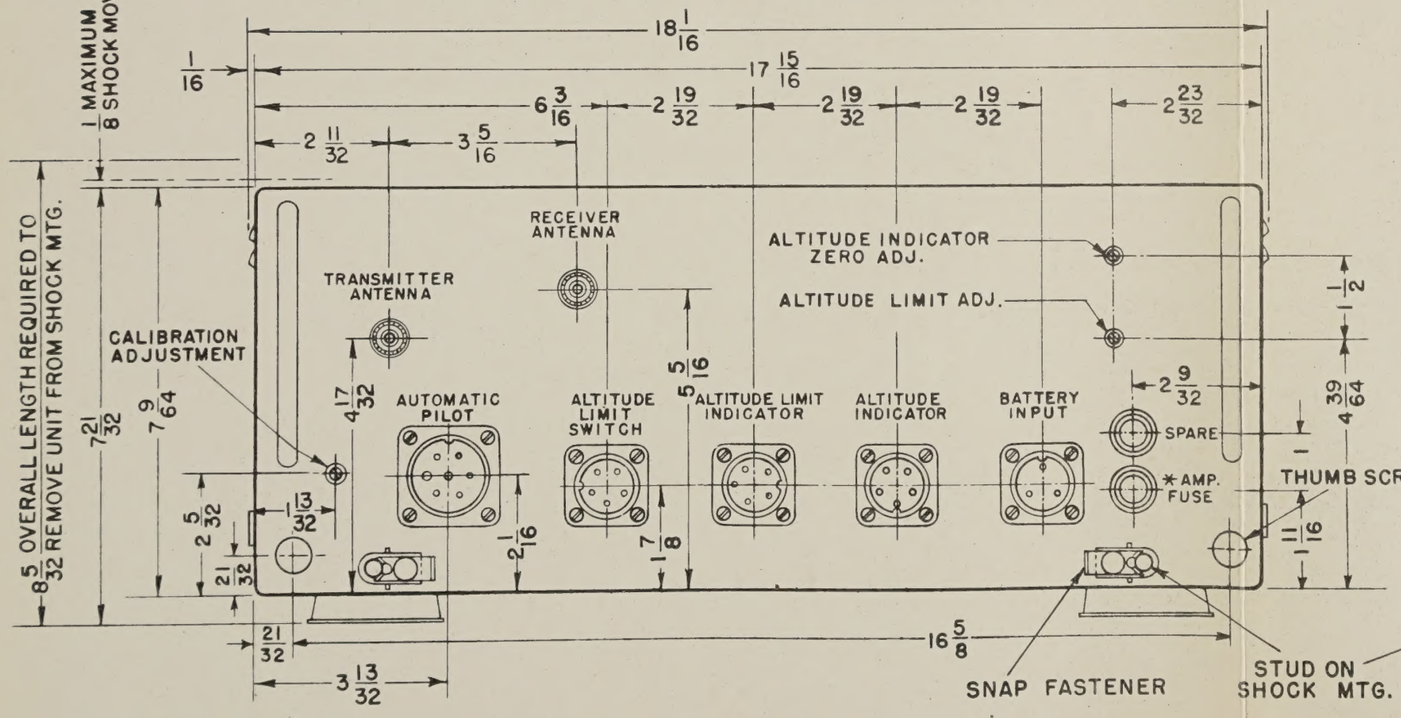
Figure 4—Radio Transmitter-Receiver—Outline (Dwg. P-255248)



DRILLING PLAN FOR SHOCK MOUNTING

ITEM NO.	NAVY TYPE NO. OR ANB NO.	VOLTS D.C.	MFR. CODE	EQUIPMENT MODEL NO.	EQUIPMENT DIAGRAM
1	CDL-43039	27	CDL	AYD-3	P-255247
2	★RT-3A/ARN-1	27	CDL	★AN/ARN-1	
3	★RT-2A/ARN-1	13.5			
4	★RT-3/ARN-1	27	CRV		
5	★RT-2/ARN-1	13.5			
6	★MT-14/ARN-1		CDL OR CRV	AYD-3 AND ★AN/ARN-1	

NOTE- ITEMS 1 AND 2 ARE IDENTICAL EXCEPT FOR NAMEPLATE AND ARE INTERCHANGEABLE WITH ITEM 4 EXCEPT FOR DYNAMOTOR BRUSH REPLACEMENT PARTS. ITEMS 3 AND 5 ARE INTERCHANGEABLE EXCEPT FOR DYNAMOTOR BRUSH REPLACEMENT PARTS. ITEM 6 IS IDENTICAL TO SHOCK MOUNTING ASSEMBLY USED FOR MODELS AYB-1, AYD AND AYD-2.



★ FUSE RATING 6 AMP. FOR 13.5 V. UNITS AND 3 AMP. FOR 27 V. UNITS.

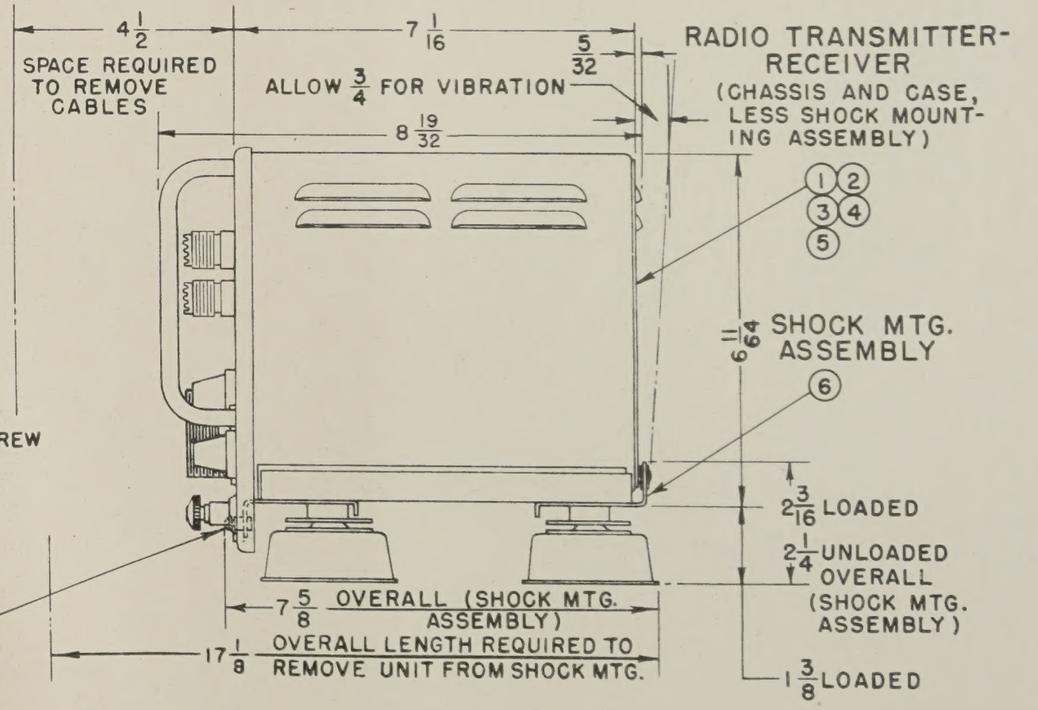
WEIGHT—POUNDS

UNIT	SHOCK MOUNTING
17.7	1.5

FOR MODELS AYD-3 AND ★AN/ARN-1

(50 OHM R-F TRANSMISSION SYSTEM)

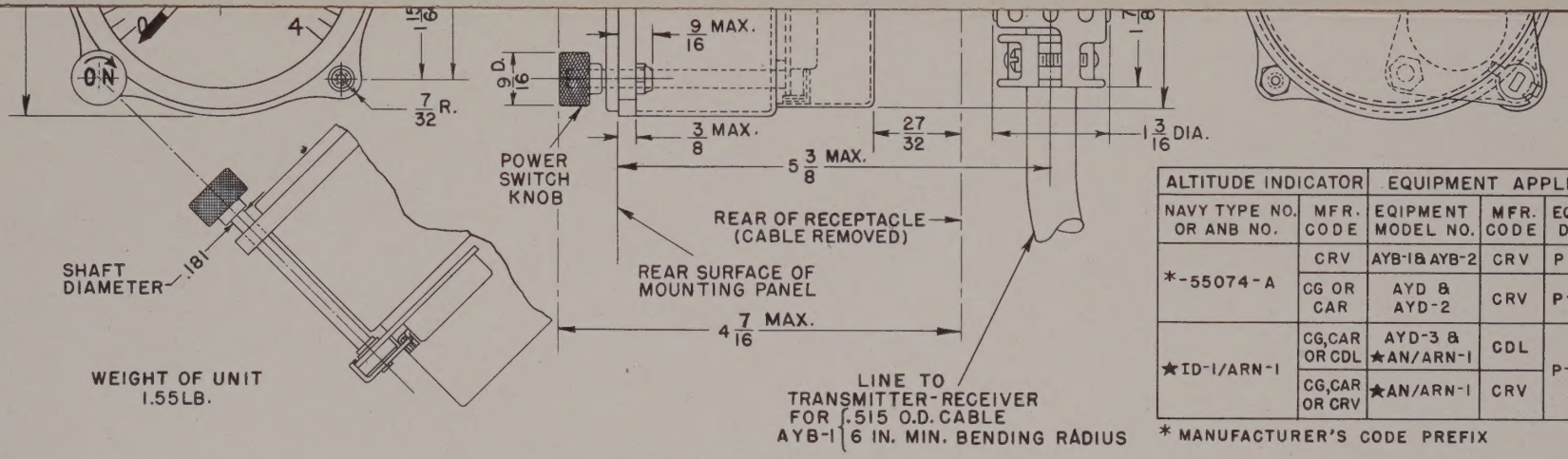
RADIO TRANSMITTER-RECEIVER AND SHOCK MOUNTING ASSEMBLY



NOTE:
TO REMOVE CHASSIS AND CASE FROM SHOCK MOUNTING, LOOSEN SNAP FASTENERS, PULL UNIT FORWARD 1 INCH AND LIFT 1/2 INCH TO CLEAR ANGLES ON SHOCK MOUNTING.

TO REMOVE CHASSIS FROM CASE AND SHOCK MOUNTING, LOOSEN THUMB SCREWS AND PULL CHASSIS FORWARD 7 INCHES.

Figure 4—Radio Transmitter-Receiver—Outline (Dwg. P-255248)

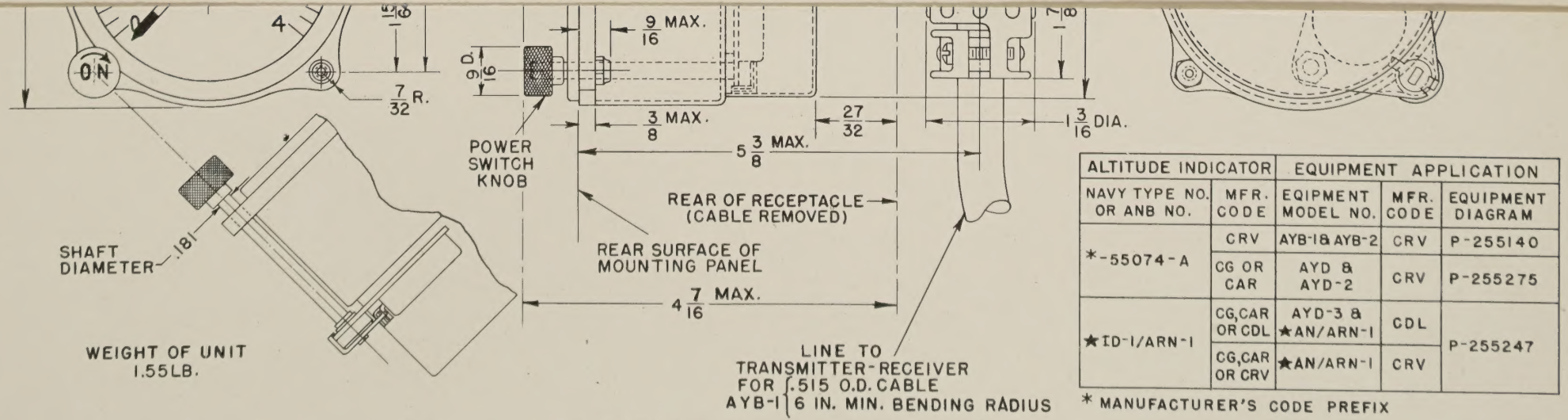


ALTITUDE INDICATORS
FOR AYB-1, AYD SERIES AND ★AN/ARN-1

ALTITUDE INDICATOR		EQUIPMENT APPLICATION		
NAVY TYPE NO. OR ANB NO.	MFR. CODE	EQIPMENT MODEL NO.	MFR. CODE	EQUIPMENT DIAGRAM
*-55074-A	CRV	AYB-1& AYB-2	CRV	P-255140
	CG OR CAR	AYD & AYD-2	CRV	P-255275
★ID-1/ARN-1	CG,CAR OR CDL	AYD-3 & ★AN/ARN-1	CDL	P-255247
	CG,CAR OR CRV	★AN/ARN-1	CRV	

* MANUFACTURER'S CODE PREFIX

Figure 5—Altitude Indicator—Outline (Dwg. M-253155)

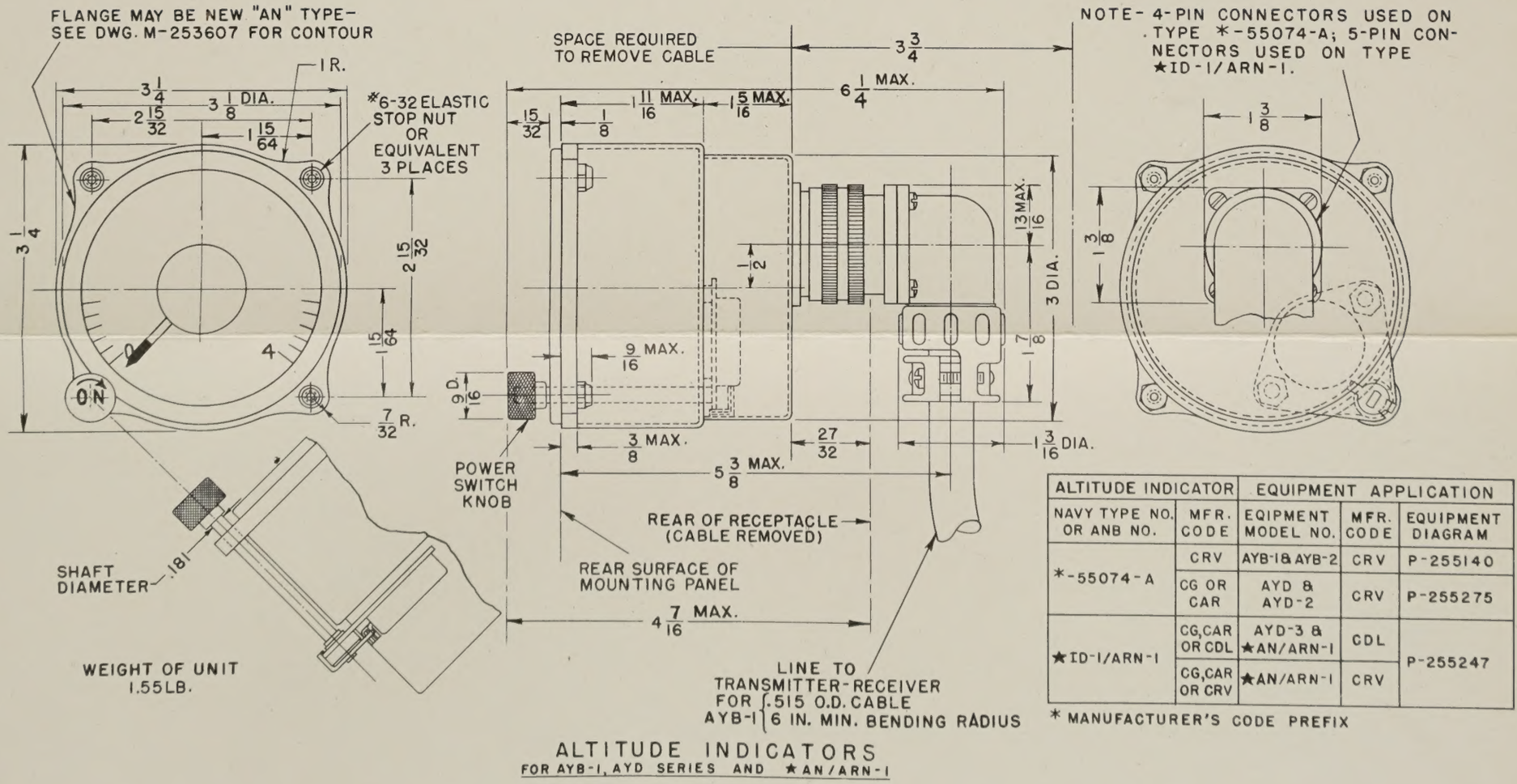


ALTITUDE INDICATOR		EQUIPMENT APPLICATION		
NAVY TYPE NO. OR ANB NO.	MFR. CODE	EQIPMENT MODEL NO.	MFR. CODE	EQUIPMENT DIAGRAM
*-55074-A	CRV	AYB-1 & AYB-2	CRV	P-255140
	CG OR CAR	AYD & AYD-2	CRV	P-255275
★ID-1/ARN-1	CG,CAR OR CDL	AYD-3 & ★AN/ARN-1	CDL	P-255247
	CG,CAR OR CRV	★AN/ARN-1	CRV	

* MANUFACTURER'S CODE PREFIX

ALTITUDE INDICATORS
FOR AYB-1, AYD SERIES AND ★AN/ARN-1

Figure 5—Altitude Indicator—Outline (Dwg. M-253155)

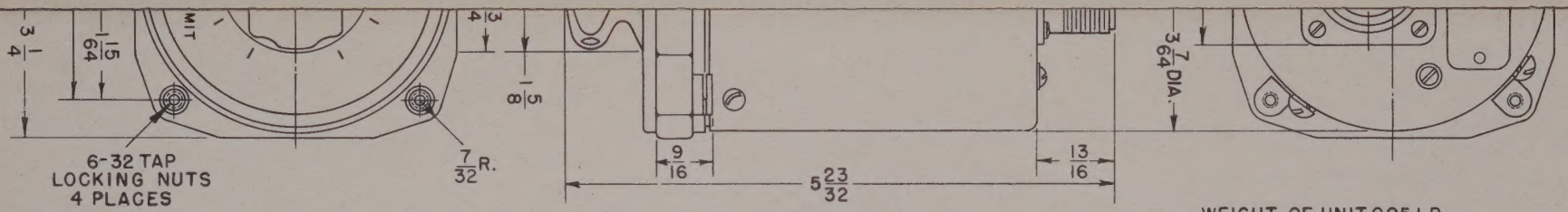


ALTITUDE INDICATOR		EQUIPMENT APPLICATION		
NAVY TYPE NO. OR ANB NO.	MFR. CODE	EQIPMENT MODEL NO.	MFR. CODE	EQUIPMENT DIAGRAM
*-55074-A	CRV	AYB-1& AYB-2	CRV	P-255140
	CG OR CAR	AYD & AYD-2	CRV	P-255275
★ID-1/ARN-1	CG,CAR OR CDL	AYD-3 & ★AN/ARN-1	CDL	P-255247
	CG,CAR OR CRV	★AN/ARN-1	CRV	

* MANUFACTURER'S CODE PREFIX

ALTITUDE INDICATORS
FOR AYB-1, AYD SERIES AND ★AN/ARN-1

Figure 5—Altitude Indicator—Outline (Dwg. M-253155)

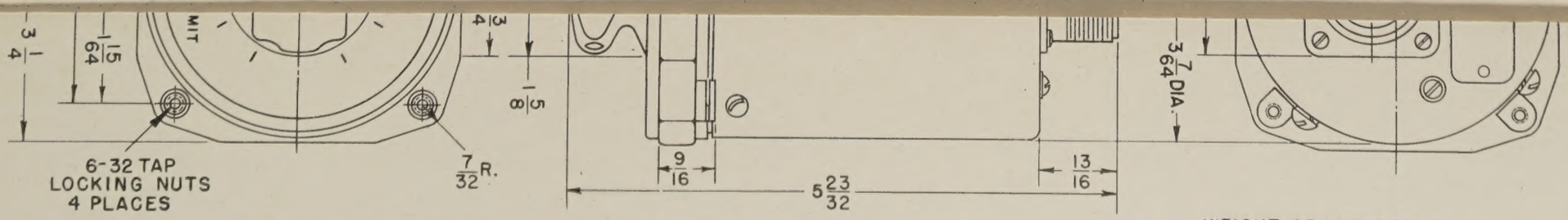


WEIGHT OF UNIT 0.95 LB.

NAVY TYPE NO. OR ANB NO.	MFR. CODE	EQUIPMENT MODEL NO.	EQUIPMENT DIAGRAM
CRV-24130	CRV	AYD	P-255275
	CRV	AYD-2	
★SA-1/ARN-1 (SAME AS NAVY TYPE #24130 EXCEPT NAMEPLATE)	CDL	AYD-3	P-255247
	CDL	★AN/ARN-1	
	CRV		

ALTITUDE LIMIT SWITCH
FOR AYD SERIES AND ★AN/ARN-1

Figure 6—Altitude Limit Switch—Outline (Dwg. M-253607)

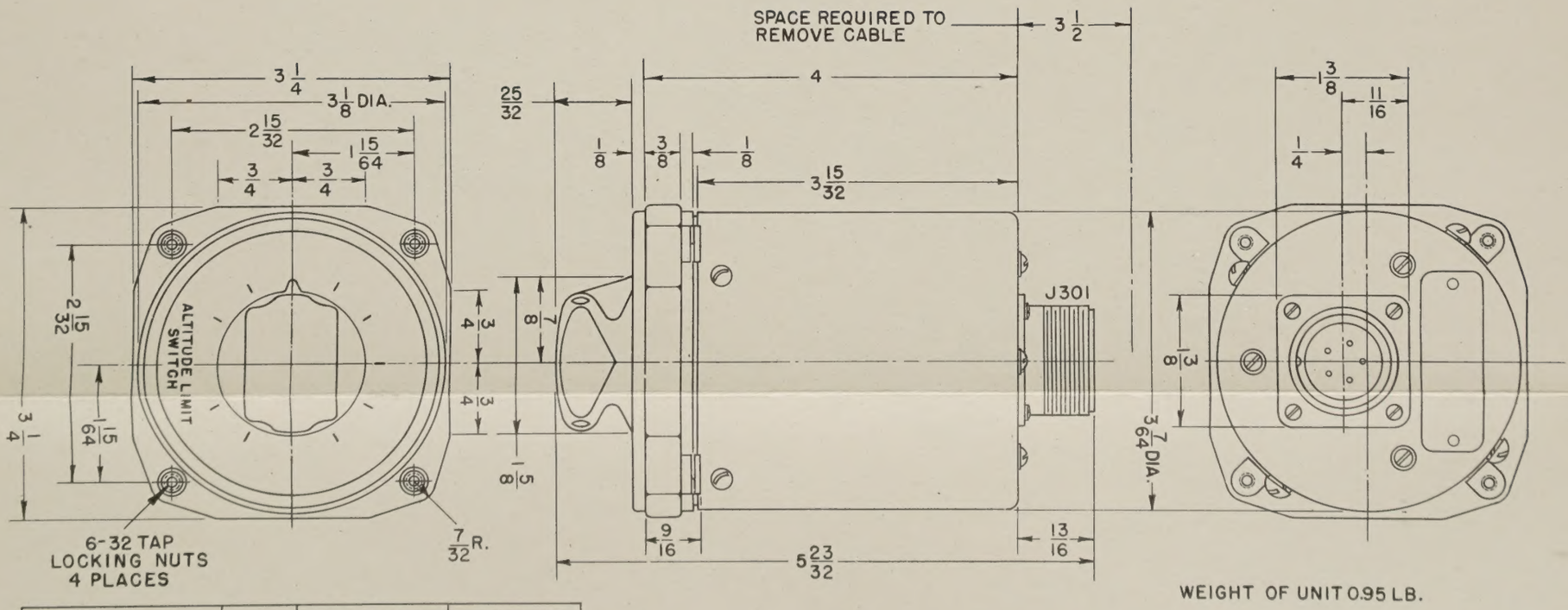


WEIGHT OF UNIT 0.95 LB.

NAVY TYPE NO. OR ANB NO.	MFR. CODE	EQUIPMENT MODEL NO.	EQUIPMENT DIAGRAM
CRV-24130	CRV	AYD	P-255275
	CRV	AYD-2	
★SA-1/ARN-1 (SAME AS NAVY TYPE #24130 EXCEPT NAMEPLATE)	CDL	AYD-3	P-255247
	CDL	★AN/ARN-1	
	CRV		

ALTITUDE LIMIT SWITCH
FOR AYD SERIES AND ★AN/ARN-1

Figure 6—Altitude Limit Switch—Outline (Dwg. M-253607)

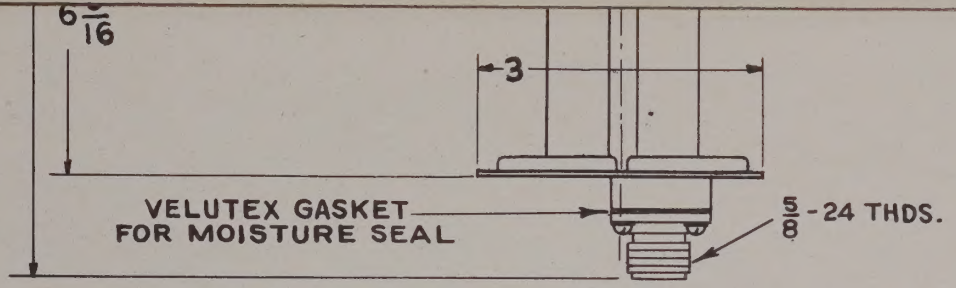


WEIGHT OF UNIT 0.95 LB.

NAVY TYPE NO. OR ANB NO.	MFR. CODE	EQUIPMENT MODEL NO.	EQUIPMENT DIAGRAM
CRV-24130	CRV	AYD	P-255275
	CRV	AYD-2	
★SA-1/ARN-1 (SAME AS NAVY TYPE #24130 EXCEPT NAMEPLATE)	CDL	AYD-3	P-255247
	CDL	★AN/ARN-1	
	CRV		

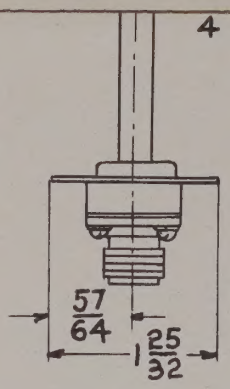
ALTITUDE LIMIT SWITCH
FOR AYD SERIES AND ★AN/ARN-1

Figure 6—Altitude Limit Switch—Outline (Dwg. M-253607)

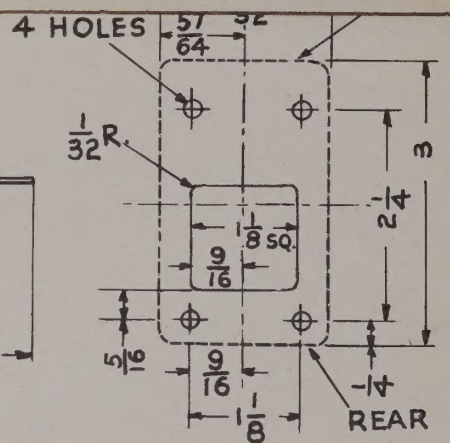


NAVY TYPE NO. OR ANB NO.	MFR. CODE	EQUIPMENT MODEL NO.	EQUIPMENT DIAGRAM
*-66083 OR ★AT-4/ARN-1	CDL	AYD-3, ★AN/ARN-1	P-255247
	CRV	★AN/ARN-1	

*MANUFACTURER'S CODE PREFIX

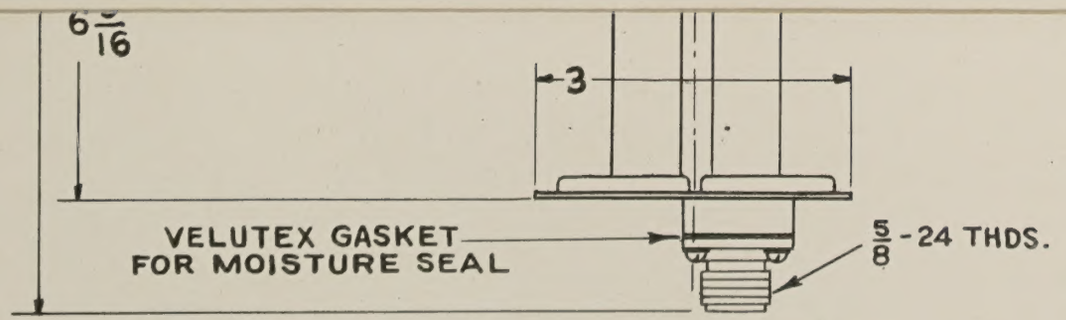


WEIGHT OF UNIT
0.7 LB.



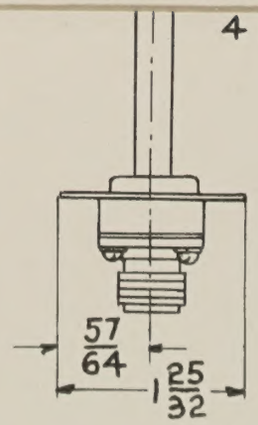
DRILLING PLAN

Figure 7—Antenna Assembly-Outline (Dwg. K-252401)

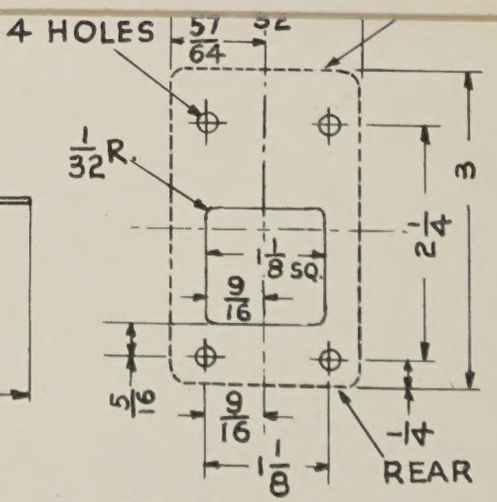


NAVY TYPE NO. OR ANB NO.	MFR. CODE	EQUIPMENT MODEL NO.	EQUIPMENT DIAGRAM
*-66083 OR ★AT-4/ARN-1	CDL	AYD-3, ★AN/ARN-1	P-255247
	CRV	★AN/ARN-1	

*MANUFACTURER'S CODE PREFIX

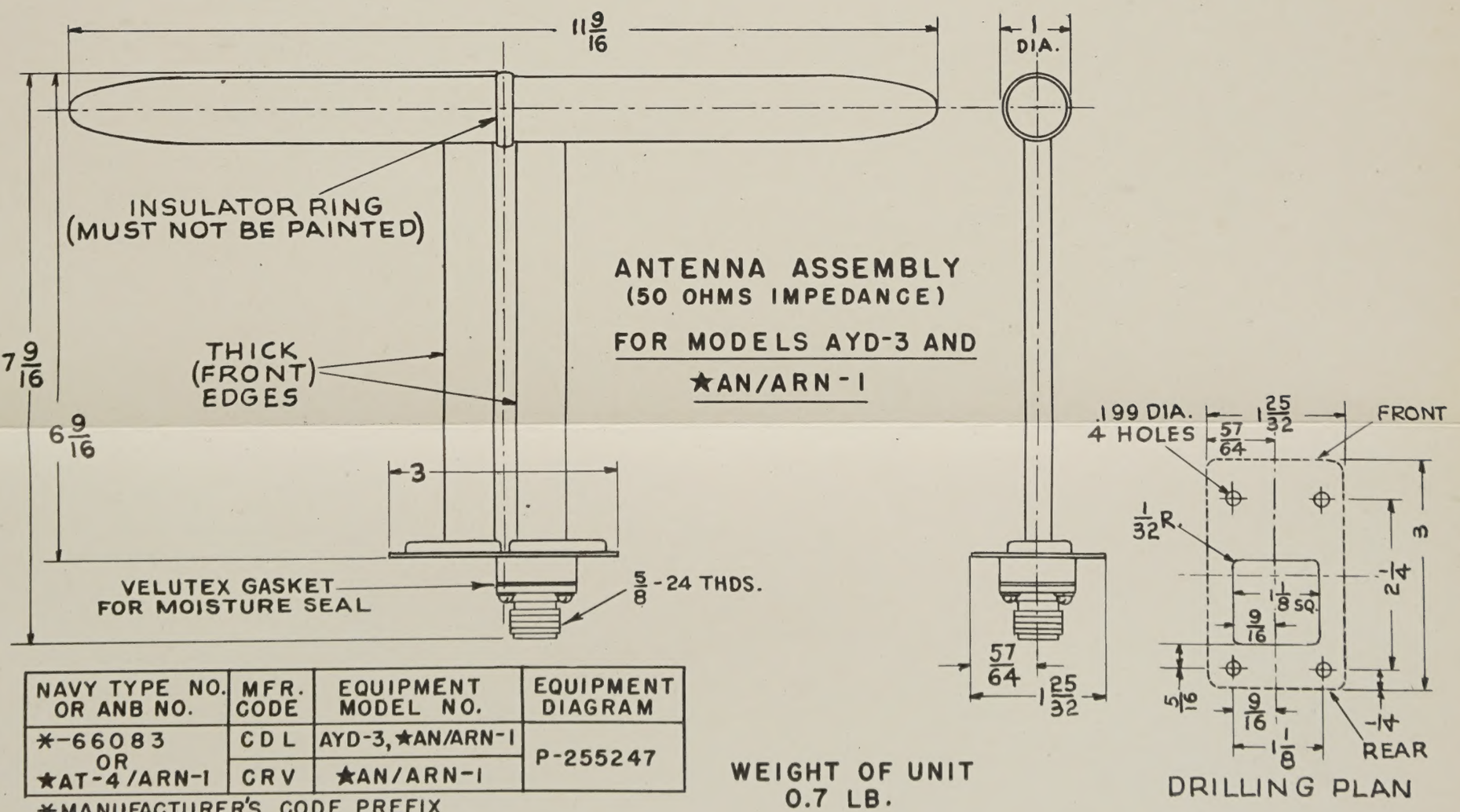


WEIGHT OF UNIT
0.7 LB.



DRILLING PLAN

Figure 7—Antenna Assembly-Outline
(Dwg. K-252401)

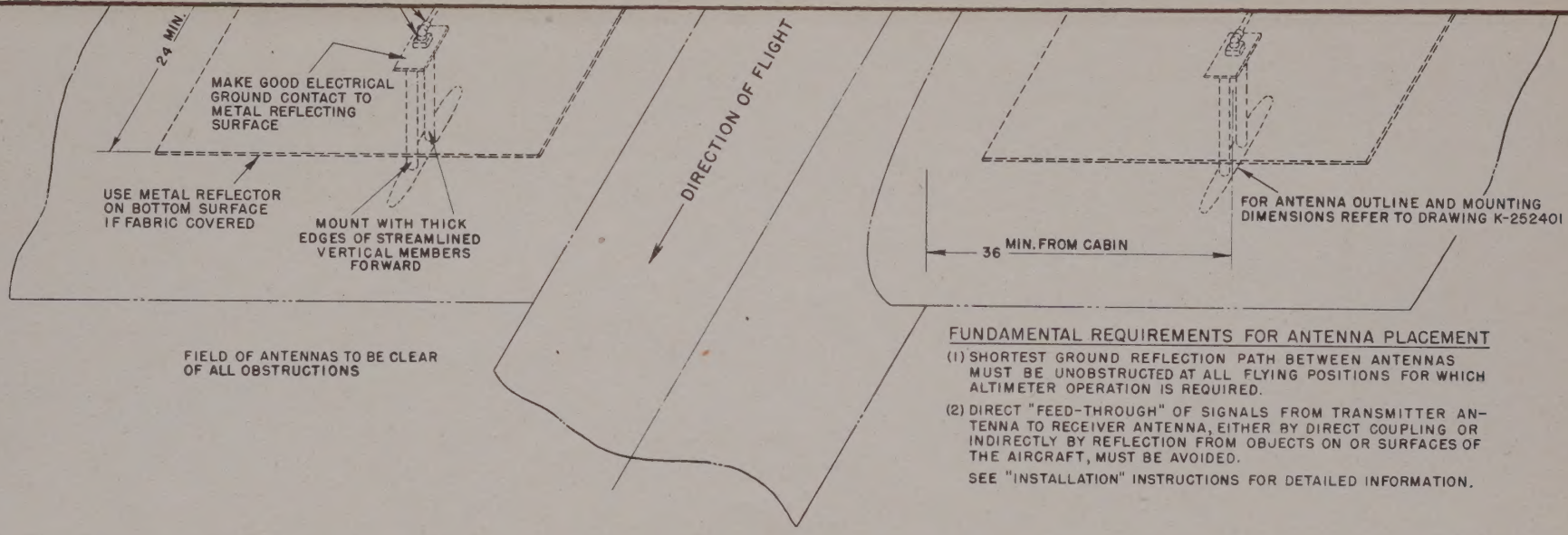


NAVY TYPE NO. OR ANB NO.	MFR. CODE	EQUIPMENT MODEL NO.	EQUIPMENT DIAGRAM
*-66083 OR ★AT-4/ARN-1	CDL	AYD-3, ★AN/ARN-1	P-255247
	CRV	★AN/ARN-1	

*MANUFACTURER'S CODE PREFIX

WEIGHT OF UNIT
0.7 LB.

Figure 7—Antenna Assembly-Outline (Dwg. K-252401)


24 MIN.
MAKE GOOD ELECTRICAL GROUND CONTACT TO METAL REFLECTING SURFACE
USE METAL REFLECTOR ON BOTTOM SURFACE IF FABRIC COVERED
MOUNT WITH THICK EDGES OF STREAMLINED VERTICAL MEMBERS FORWARD
DIRECTION OF FLIGHT
FIELD OF ANTENNAS TO BE CLEAR OF ALL OBSTRUCTIONS
36 MIN. FROM CABIN
FOR ANTENNA OUTLINE AND MOUNTING DIMENSIONS REFER TO DRAWING K-252401

FUNDAMENTAL REQUIREMENTS FOR ANTENNA PLACEMENT

(1) SHORTEST GROUND REFLECTION PATH BETWEEN ANTENNAS MUST BE UNOBSTRUCTED AT ALL FLYING POSITIONS FOR WHICH ALTIMETER OPERATION IS REQUIRED.

(2) DIRECT "FEED-THROUGH" OF SIGNALS FROM TRANSMITTER ANTENNA TO RECEIVER ANTENNA, EITHER BY DIRECT COUPLING OR INDIRECTLY BY REFLECTION FROM OBJECTS ON OR SURFACES OF THE AIRCRAFT, MUST BE AVOIDED.

SEE "INSTALLATION" INSTRUCTIONS FOR DETAILED INFORMATION.

Figure 8—Antenna Installation Diagram (Dwg. P-255249)

FUNDAMENTAL REQUIREMENTS FOR ANTENNA PLACEMENT
(1) SHORTEST GROUND REFLECTION PATH BETWEEN ANTENNAS MUST BE UNOBSTRUCTED AT ALL FLYING POSITIONS FOR WHICH ALTIMETER OPERATION IS REQUIRED.
(2) DIRECT "FEED-THROUGH" OF SIGNALS FROM TRANSMITTER ANTENNA TO RECEIVER ANTENNA, EITHER BY DIRECT COUPLING OR INDIRECTLY BY REFLECTION FROM OBJECTS ON OR SURFACES OF THE AIRCRAFT, MUST BE AVOIDED.
SEE "INSTALLATION" INSTRUCTIONS FOR DETAILED INFORMATION.
FOR ANTENNA OUTLINE AND MOUNTING DIMENSIONS REFER TO DRAWING K-252401
36 MIN. FROM CABIN
DIRECTION OF FLIGHT
FIELD OF ANTENNAS TO BE CLEAR OF ALL OBSTRUCTIONS
MOUNT WITH THICK EDGES OF STREAMLINED VERTICAL MEMBERS FORWARD
MAKE GOOD ELECTRICAL GROUND CONTACT TO METAL REFLECTING SURFACE
USE METAL REFLECTOR ON BOTTOM SURFACE IF FABRIC COVERED
24 MIN.

Figure 8—Antenna Installation Diagram
(Dwg. P-255249)

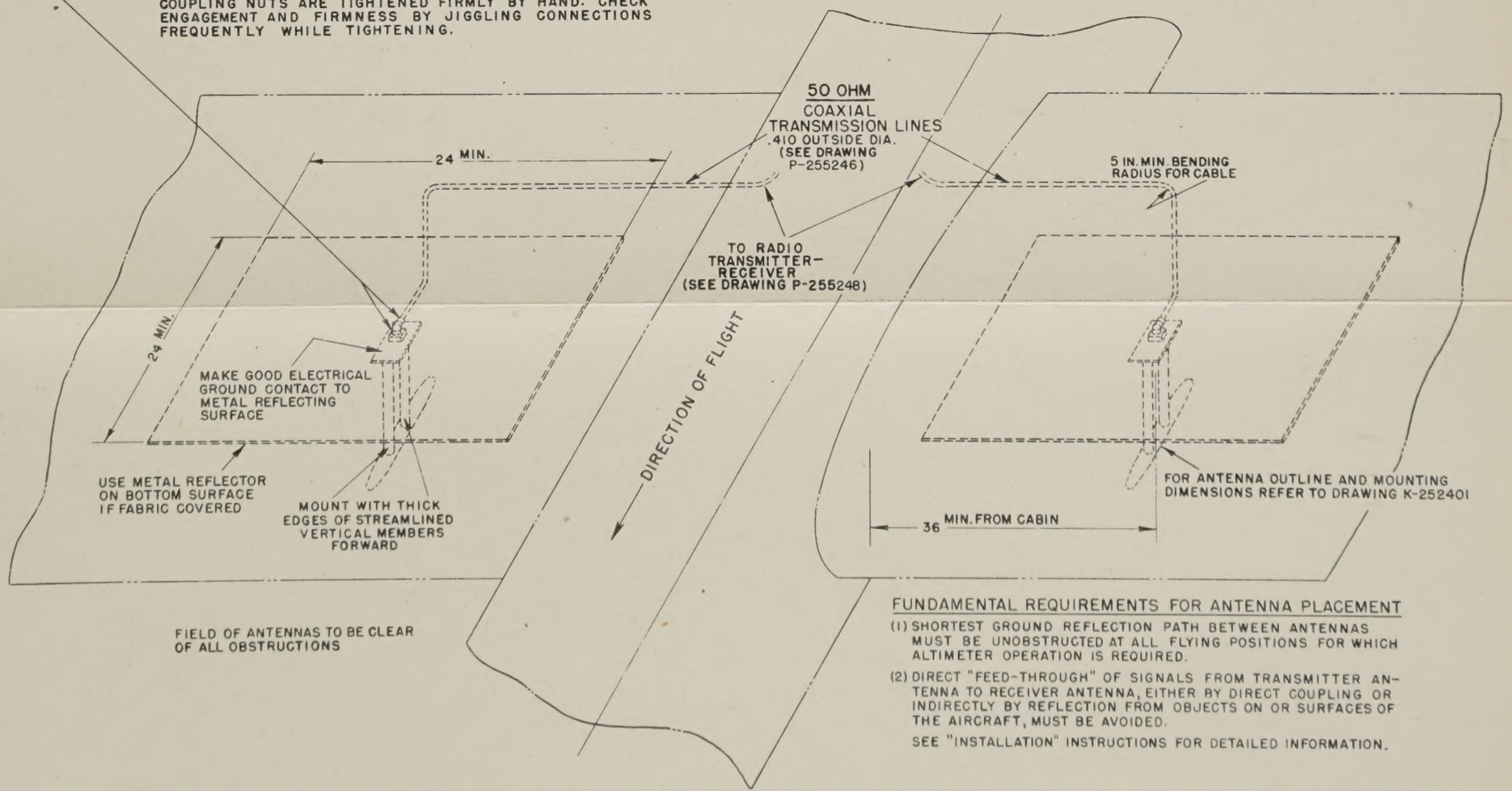
AYD-3 AND ★AN/ARN-1
ANTENNA INSTALLATION DIAGRAM

NOTE:
WITH AXES OF TRANSMITTER AND RECEIVER ANTENNAS PARALLEL AS SHOWN, INTERMEDIATE SHIELDING IS REQUIRED AND IS NORMALLY PROVIDED BY METAL FUSELAGE.

THE TWO ANTENNAS CAN ALSO BE INSTALLED UNDERNEATH FUSELAGE APPROXIMATELY 7 FT. APART ON A COMMON AXIS APPROXIMATELY PARALLEL TO AXIS OF FUSELAGE. THIS METHOD DOES NOT REQUIRE SHIELDING AND IS RECOMMENDED IN ALL CASES WHEN FUSELAGE IS FABRIC COVERED.

SEE ANTENNA INSTALLATION INSTRUCTIONS

IMPORTANT — MAKE SURE THAT TEETH AT MALE ENDS OF FITTINGS ARE ENGAGED WITH NOTCHES AT FEMALE ENDS BEFORE THE COUPLING NUTS ARE TIGHTENED FIRMLY BY HAND. CHECK ENGAGEMENT AND FIRMNESS BY JIGGLING CONNECTIONS FREQUENTLY WHILE TIGHTENING.



FIELD OF ANTENNAS TO BE CLEAR OF ALL OBSTRUCTIONS

FUNDAMENTAL REQUIREMENTS FOR ANTENNA PLACEMENT

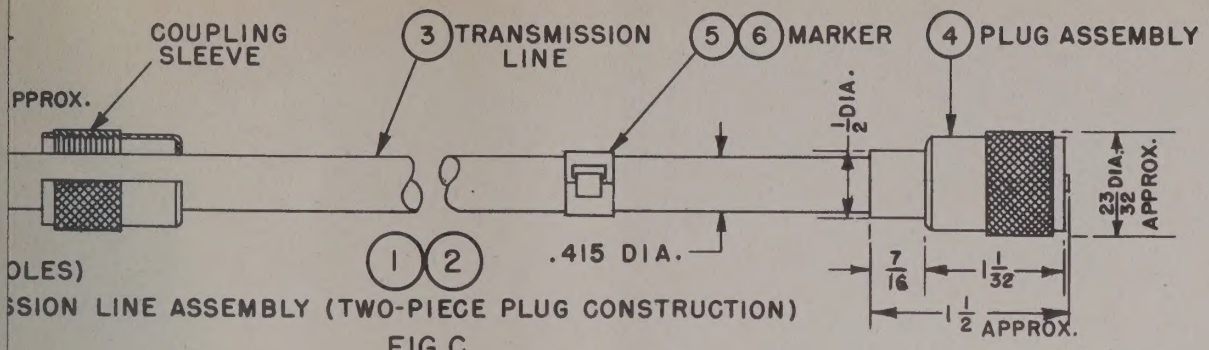
(1) SHORTEST GROUND REFLECTION PATH BETWEEN ANTENNAS MUST BE UNOBSTRUCTED AT ALL FLYING POSITIONS FOR WHICH ALTIMETER OPERATION IS REQUIRED.

(2) DIRECT "FEED-THROUGH" OF SIGNALS FROM TRANSMITTER ANTENNA TO RECEIVER ANTENNA, EITHER BY DIRECT COUPLING OR INDIRECTLY BY REFLECTION FROM OBJECTS ON OR SURFACES OF THE AIRCRAFT, MUST BE AVOIDED.

SEE "INSTALLATION" INSTRUCTIONS FOR DETAILED INFORMATION.

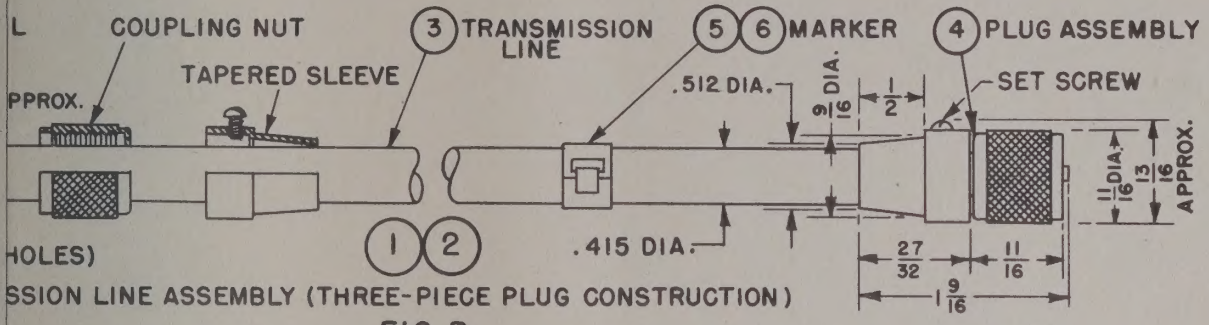
Figure 8—Antenna Installation Diagram (Dwg. P-255249)

USE ONLY NON-CORROSIVE ROSIN CORE SOLDER.



OLES)
SSION LINE ASSEMBLY (TWO-PIECE PLUG CONSTRUCTION)

FIG.C



HOLES)
SSION LINE ASSEMBLY (THREE-PIECE PLUG CONSTRUCTION)

FIG.B

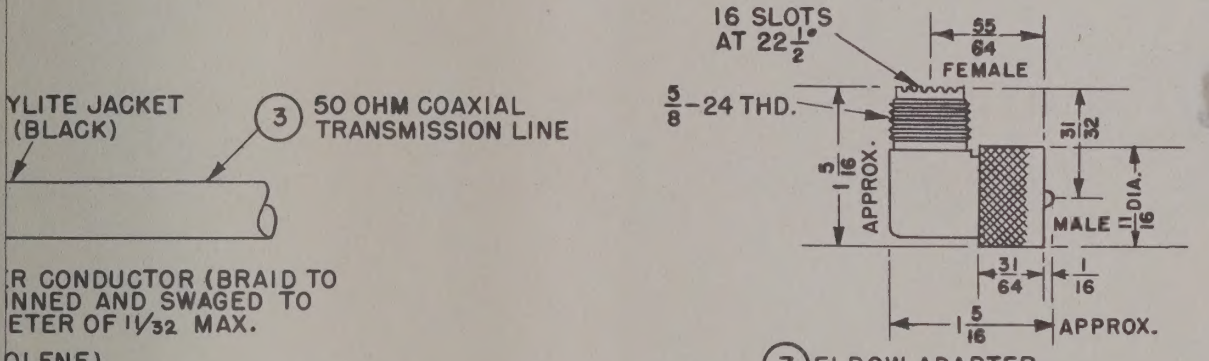


FIG.D

AYD-3 AND ★AN/ARN-1

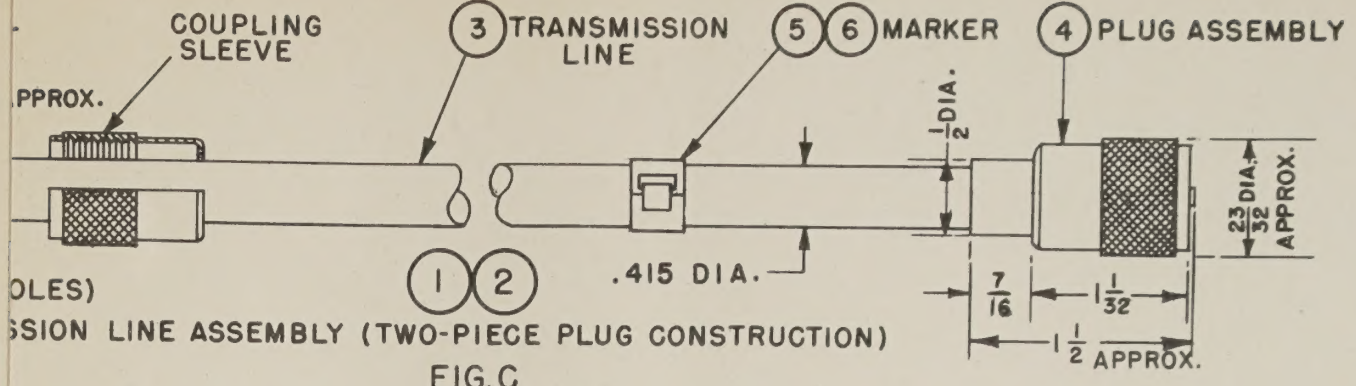
N LINE MATERIALS AND FITTINGS—FURNISHED IN BULK

DESCRIPTION	NAVY TYPE NUMBER	RCA DRAWING	UNIT WEIGHT (POUNDS)	QUANTITY W501	QUANTITY W502
ER ANTENNA TRANSMISSION LINE ASSEMBLY		THIS DWG.		X	
ITTER ANT. TRANSMISSION LINE ASSEMBLY		THIS DWG.			X
COAXIAL TRANSMISSION LINE	CASSF-50-1	K-871757-2	0.10/FT.	*	*
L PLUG, MALE	49195	P-255223-9	0.06	2	2
MARKER (RECEIVER ANTENNA ★AN/ARN-1)		29874-2	NEGLIGIBLE	1	
MARKER (TRANSMITTER ANTENNA ★AN/ARN-1)		29874-3	NEGLIGIBLE		1
L ELBOW ADAPTER	CSX-49192△	K-252666-1	0.08	X	X

47 FOR QUANTITY SUPPLIED PER EQUIPMENT.
THS OF 200 FEET ON REELS. SEE EQUIPMENT DIAGRAM P-255247 FOR TOTAL LENGTH SUPPLIED PER EQUIPMENT.
. CORP. - DO NOT SUBSTITUTE NAVY TYPE NO. 49192 ADAPTER OF ANY OTHER MAKE.

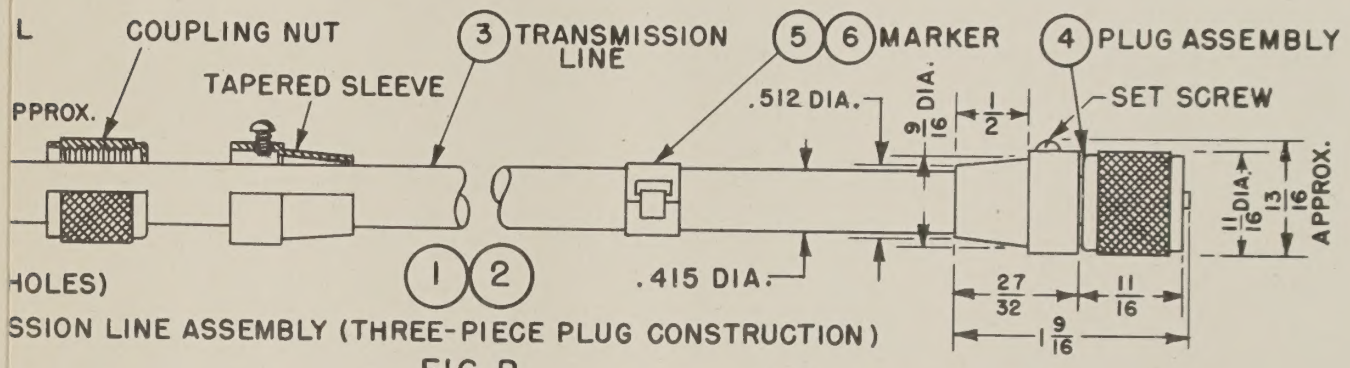
Figure 9—Antenna Transmission Lines—Outline-Assembly (Dwg. P-255246)

USE ONLY NON-CORROSIVE ROSIN CORE SOLDER.



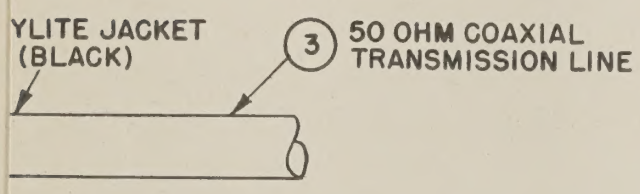
SSION LINE ASSEMBLY (TWO-PIECE PLUG CONSTRUCTION)

FIG.C



SSION LINE ASSEMBLY (THREE-PIECE PLUG CONSTRUCTION)

FIG.B



ER CONDUCTOR (BRAID TO INNED AND SWAGED TO ETER OF 1 1/32 MAX.

OLENE)

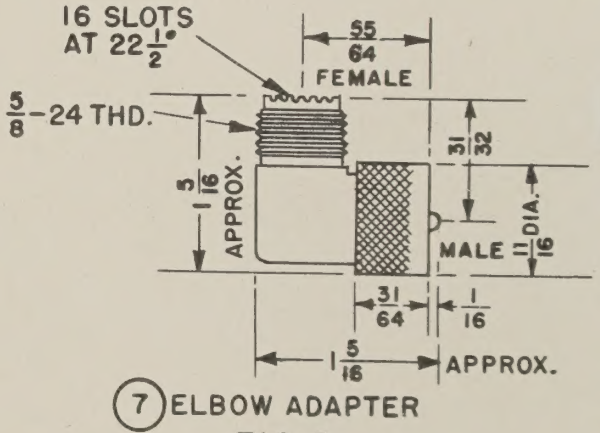


FIG.D

AYD-3 AND ★AN/ARN-1

N LINE MATERIALS AND FITTINGS—FURNISHED IN BULK

DESCRIPTION	NAVY TYPE NUMBER	RCA DRAWING	UNIT WEIGHT (POUNDS)	QUANTITY W501	QUANTITY W502
ER ANTENNA TRANSMISSION LINE ASSEMBLY		THIS DWG.		X	
ITTER ANT. TRANSMISSION LINE ASSEMBLY		THIS DWG.			X
COAXIAL TRANSMISSION LINE	CASSF-50-1	K-871757-2	0.10/FT.	*	*
L PLUG, MALE	49195	P-255223-9	0.06	2	2
MARKER (RECEIVER ANTENNA ★AN/ARN-1)		29874-2	NEGLIGIBLE	1	
MARKER (TRANSMITTER ANTENNA ★AN/ARN-1)		29874-3	NEGLIGIBLE		1
L ELBOW ADAPTER	CSX-49192△	K-252666-1	0.08	X	X

47 FOR QUANTITY SUPPLIED PER EQUIPMENT.

THS OF 200 FEET ON REELS. SEE EQUIPMENT DIAGRAM P-255247 FOR TOTAL LENGTH SUPPLIED PER EQUIPMENT.

. CORP. - DO NOT SUBSTITUTE NAVY TYPE NO. 49192 ADAPTER OF ANY OTHER MAKE.

Figure 9—Antenna Transmission Lines—Outline-Assembly (Dwg. P-255246)

WIRING AND ASSEMBLY INSTRUCTIONS

1. CUT BULK TRANSMISSION LINE (ITEM 3) TO LENGTHS REQUIRED FOR THE PARTICULAR INSTALLATION (SEE EQUIPMENT DIAGRAM, DWG. P-255247). TRIM BOTH ENDS OF EACH CABLE AS SHOWN IN FIGURE A. HOT TIN DIP INNER CONDUCTOR EXTENSIONS AND TIN OUTER CONDUCTOR BRAID TO WITHIN 1/8 INCH FROM VINYLITE JACKET. AVOID SURPLUS SOLDER AND EXCESSIVE HEATING OF COPOLENE DIELECTRIC AND VINYLITE JACKET. SWAGE TINNED BRAID, IF NECESSARY, TO 11/32 DIAMETER MAXIMUM.

2. DISASSEMBLE PLUGS (ITEM 4). IF PLUGS ARE OF THREE-PIECE CONSTRUCTION, SLIP TAPERED SLEEVE AND COUPLING NUT OVER EACH END OF CABLES IN THE RELATION SHOWN AT LEFT IN FIGURE B. IF PLUGS ARE OF TWO-PIECE CONSTRUCTION (AS SUPPLIED BY AMERICAN PHENOLIC CORP., THEIR CATALOG NO. 83-1SP), SLIP COUPLING SLEEVE OVER CABLE WITH KNURLED PORTION TOWARD END OF CABLE, AS SHOWN AT LEFT IN FIGURE C.

3. FEED ENDS OF CABLE INTO PLUG TERMINAL MEMBERS SO THAT END OF INNER CONDUCTOR IS APPROXIMATELY FLUSH WITH TIP OF HOLLOW TERMINAL AND TINNED BRAID EXTENDS SLIGHTLY BEYOND THE FOUR SOLDERING HOLES IN THE NECK, AS SHOWN IN FIGURES B AND C. BOTH TYPES OF PLUGS HAVE INTERNAL THREADS WHICH ENGAGE THE VINYLITE OUTER JACKET OF THE CABLE. THE TYPE SHOWN IN FIGURE B IS SLOTTED TO PERMIT EXPANSION FOR INSERTION OF CABLE. THE TYPE SHOWN IN FIGURE C IS NOT SLOTTED AND MUST BE TURNED SO AS TO THREAD ONTO VINYLITE JACKET. AT LEAST 1/4 INCH OF JACKET SHOULD ENTER THREADED PORTION OF TERMINAL MEMBER.

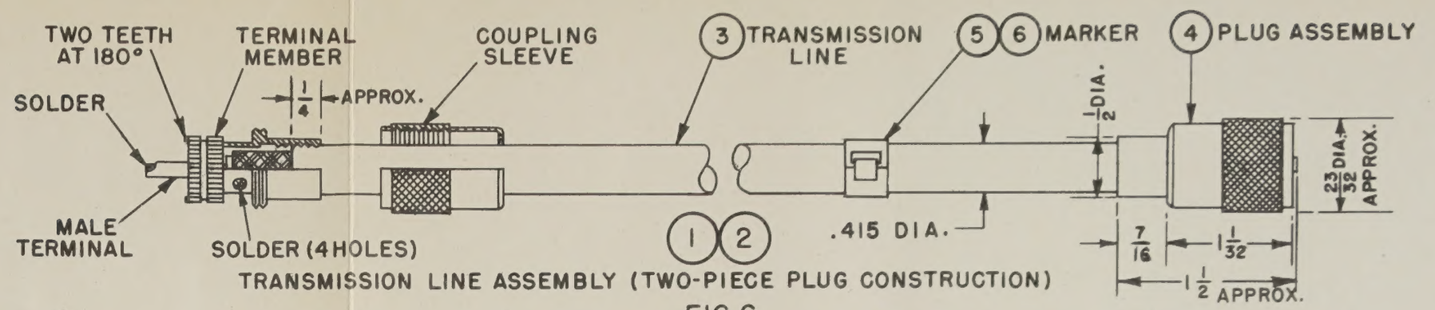
4. USING NON-CORROSIVE FLUX OR ROSIN CORE SOLDER, CAREFULLY SOLDER END OF INNER CONDUCTOR TO TERMINAL TIP AND SOLDER BRAID TO NECK OF TERMINAL MEMBER AT FOUR HOLES. AVOID EXCESS SOLDER AND REMOVE ALL SOLDER ON OUTER PERIPHERY OF HOLLOW PIN TERMINAL TO PREVENT MATING INTERFERENCE. SNIP OFF CONDUCTOR EXTENSION (IF ANY) FLUSH WITH TIP OF TERMINAL.

5. REASSEMBLE PLUGS AS SHOWN AT RIGHT OF FIGURES B AND C. IF PLUG IS OF THREE-PIECE CONSTRUCTION (FIGURE B), DRAW TAPERED SLEEVE OVER SLOTTED MEMBER AND TIGHTEN SETSCREW FIRMLY AGAINST SOLID METAL PORTION OF NECK, AFTER ADJUSTING FOR MINIMUM CLEARANCE WHICH WILL ALLOW COUPLING NUT TO TURN FREELY. IF PLUG IS OF TWO-PIECE CONSTRUCTION (FIGURE C), THREAD KNURLED COUPLING SLEEVE ONTO TERMINAL MEMBER UNTIL THREADS DISENGAGE.

6. ATTACH CABLE MARKERS 5 AND 6 TO RECEIVER AND TRANSMITTER ANTENNA TRANSMISSION LINES W501 AND W502 RESPECTIVELY, AS SHOWN IN FIGURES B AND C.

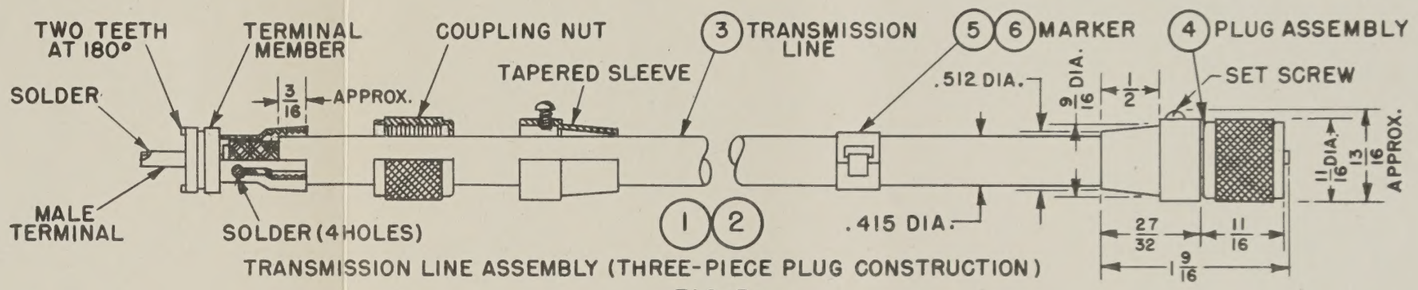
7. THE ELBOW ADAPTERS (ITEM 7) MAY BE INTERPOSED BETWEEN TRANSMISSION LINES AND RECEPTACLES J101 AND J102 OF TRANSMITTER-RECEIVER AND J401 AND J402 OF ANTENNAS, AS INDICATED ON DWG. P-255247, OR TRANSMISSION LINES MAY BE CONNECTED TO RECEPTACLES DIRECTLY. IF ADAPTERS ARE TO BE USED, COUPLE FEMALE END OF ADAPTER TO MALE PLUG AT EACH END OF TRANSMISSION LINES. MAKE SURE THAT TEETH AT FRONT RIM OF PLUGS ARE ENGAGED WITH NOTCHES AT RIM OF ADAPTER BEFORE COUPLING NUTS ARE FIRMLY TIGHTENED.

NOTE- FOR ALL SOLDERING, USE ONLY NON-CORROSIVE ROSIN CORE SOLDER.



TRANSMISSION LINE ASSEMBLY (TWO-PIECE PLUG CONSTRUCTION)

FIG.C



TRANSMISSION LINE ASSEMBLY (THREE-PIECE PLUG CONSTRUCTION)

FIG.B

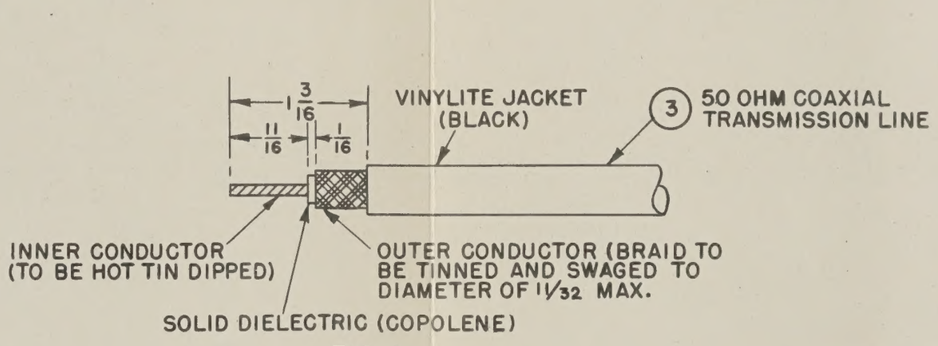

1 3/16
11/16
1/16
VINYLITE JACKET (BLACK)
3 50 OHM COAXIAL TRANSMISSION LINE
INNER CONDUCTOR (TO BE HOT TIN DIPPED)
OUTER CONDUCTOR (BRAID TO BE TINNED AND SWAGED TO DIAMETER OF 11/32 MAX.
SOLID DIELECTRIC (COPOLENE)

FIG.A

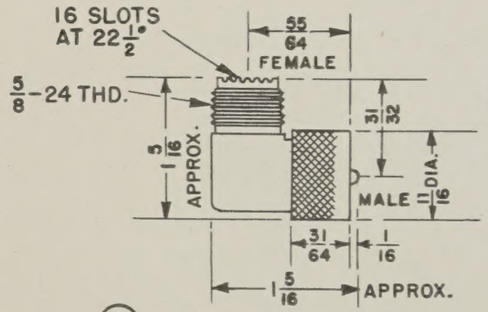


FIG.D

AYD-3 AND ★AN/ARN-1

TRANSMISSION LINE MATERIALS AND FITTINGS—FURNISHED IN BULK

ITEM NO.	ALL SYMBOL DESIGNATIONS	DESCRIPTION	NAVY TYPE NUMBER	RCA DRAWING	UNIT WEIGHT (POUNDS)	QUANTITY W501	QUANTITY W502
1	W501	RECEIVER ANTENNA TRANSMISSION LINE ASSEMBLY		THIS DWG.		X	
2	W502	TRANSMITTER ANT. TRANSMISSION LINE ASSEMBLY		THIS DWG.			X
3	W501A, 502A	50 OHM COAXIAL TRANSMISSION LINE	CASSF-50-1	K-871757-2	0.10/FT.	*	*
4	P101,102,401,402	COAXIAL PLUG, MALE	49195	P-255223-9	0.06	2	2
5		CABLE MARKER (RECEIVER ANTENNA ★AN/ARN-1)		29874-2	NEGLIGIBLE	1	
6		CABLE MARKER (TRANSMITTER ANTENNA ★AN/ARN-1)		29874-3	NEGLIGIBLE		1
7	E507,508,509,510	COAXIAL ELBOW ADAPTER	CSX-49192△	K-252666-1	0.08	X	X

X - SEE EQUIPMENT DIAGRAM P-255247 FOR QUANTITY SUPPLIED PER EQUIPMENT.
* - FURNISHED IN CONTINUOUS LENGTHS OF 200 FEET ON REELS. SEE EQUIPMENT DIAGRAM P-255247 FOR TOTAL LENGTH SUPPLIED PER EQUIPMENT.
△ - MANUFACTURED BY SELECTAR MFG. CORP. - DO NOT SUBSTITUTE NAVY TYPE NO. 49192 ADAPTER OF ANY OTHER MAKE.

Figure 9—Antenna Transmission Lines—Outline-Assembly (Dwg. P-255246)

BLE MATERIALS AND FITTINGS — FURNISHED IN BULK

IPTION	DRAWING OR SPECIFICATION	UNIT WEIGHT (POUNDS)	QUANTITY					
			W503			W504	W505	MISC.
FOR AYD, AYD-2	THIS DRAWING (4-PIN PLUGS, 4-WIRE CABLE)	-	X					
FOR AYD-3	THIS DRAWING (5-PIN PLUGS, 4-WIRE CABLE)	-		X				
FOR★AN/ARN-1	THIS DRAWING (5-PIN PLUGS, 5-WIRE CABLE)	-			X			
CH CABLE ASSEMBLY	THIS DRAWING	-				X		
LE ASSEMBLY	THIS DRAWING	-					X	
LE	RCA DWG. M-253128-1 (FOR AYD SERIES)	0.17/FT.	*	*				
LE (SEE NOTE 1)	RCA DWG. M-253128-3 (FOR★AN/ARN-1)	0.18/FT.			*			
LE	RCA DWG. M-253128-2	0.15/FT.				*		
LE	RCA DWG. M-253033-1	0.20/FT.					*	
TACTS, FEMALE ONNECTOR)	RCA DWG. P-255073-52 (AMPHENOL 97-3108J-18-5S)	0.17						X
TACTS, MALE	RCA DWG. P-255073-35 (AMPHENOL 97-3108J-18-4P)	0.15	1					
TACTS, MALE	RCA DWG. P-255262-46 (AMPHENOL 97-3108J-18-20P-POS.3)△	0.15		1	1			
TACTS, MALE CONNECTOR)	RCA DWG. P-255073-51 (AMPHENOL 97-3108J-18-20P)△	0.15						X
TACTS, MALE	RCA DWG. P-255262-38 (AMPHENOL 97-3108J-24-3P)	0.34					1	
TACTS, MALE	RCA DWG. P-255262-37 (AMPHENOL 97-3108J-18-20P-POS.2)△	0.15				1		
TACTS, FEMALE	RCA DWG. P-255073-36 (AMPHENOL 97-3108J-18-4S)		1					
TACTS, FEMALE	RCA DWG. P-255262-47 (AMPHENOL 97-3108J-18-20S-POS.3)△	0.17		1	1			
TACTS, FEMALE	RCA DWG. P-255073-53 (AMPHENOL 97-3108J-18-20S)△	0.17				1		
	RCA DWG. P-255073-34 (AMPHENOL AN-3057-10-6)	0.06	2	2	2	2		
	RCA DWG. M-253375-31 (AMPHENOL AN-3057-16-10)	0.12					1	
UCTOR	RCA — PS-499 - 1/8 72-.005 TINNED (3-1/4 LONG)	NEGLIGIBLE	2	2	2	2		
UCTOR	RCA — PS-499 - 1/8 72-.005 TINNED (3-3/4 LONG)	NEGLIGIBLE					1	
UCTOR	RCA — PS-499 - 1/8 72-.005 TINNED (1-1/4 LONG)	NEGLIGIBLE	2	2	2	2		
UCTOR	RCA — PS-499 - 1/8 72-.005 TINNED (1-3/4 LONG)	NEGLIGIBLE					1	
	RCA — PS-21 SOFT 1/2 X .010 TINNED (1-3/4 LONG)	NEGLIGIBLE	2	2	2	2		
	RCA — PS-21 SOFT 1/2 X .010 TINNED (2-1/8 LONG)	NEGLIGIBLE					1	
	RCA — PS-50 BLACK .133 I.D. (1-3/8 LONG)	NEGLIGIBLE	2	2	2	2		
	RCA — PS-50 BLACK .133 I.D. (2-1/4 LONG)	NEGLIGIBLE					1	
NDICATOR AYD SERIES	RCA DWG. 29810-1 (USED ONLY ON AYD, AYD-2)	NEGLIGIBLE	1					
NDICATOR AYD-3	RCA DWG. 29874-5 (USED ON AYD-3)			1				
NDICATOR★AN/ARN-1	RCA DWG. 29874-1 (USED ON★AN/ARN-1				1			
SWITCH AYD SERIES	RCA DWG. 29810-4 (USED ON AYD, AYD-2, AYD-3)	NEGLIGIBLE				1		
SWITCH★AN/ARN-1	RCA DWG. 29874-4 (USED ON★AN/ARN-1							
PILOT AYD SERIES	RCA DWG. 29810-5 (USED ON AYD, AYD-2, AYD-3)	NEGLIGIBLE					1	

TY SUPPLIED PER EQUIPMENT.
OF 250-400 FEET ON REELS. SEE EQUIPMENT DIAGRAM FOR LENGTH SUPPLIED PER EQUIPMENT.
IGURE C FOR P104 (ITEM 8).
NATED "683P" OR "683S" INSTEAD OF "20P" OR "20S", RESPECTIVELY, IN AMPHENOL DESIGNATIONS.

IN CONNECTION DIAGRAM FOR W503 CABLE AS-
N PLACE OF RCA DWG. M-253128-3 CABLE FOR A
EQUIPMENTS.

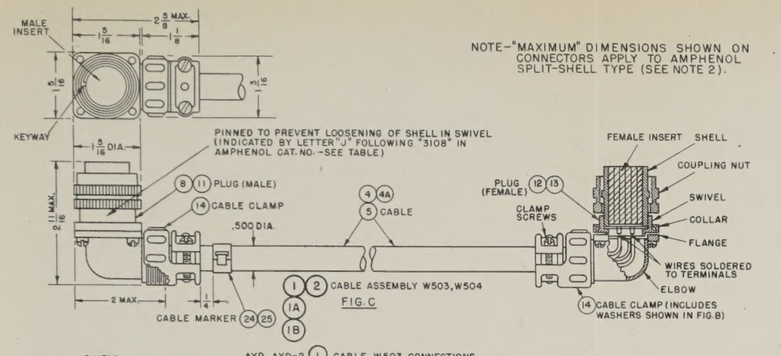
CTION, INTERCHANGEABLE WITH THE FLANGE TYPE
D WITH SOME EQUIPMENTS, AS FOLLOWS:

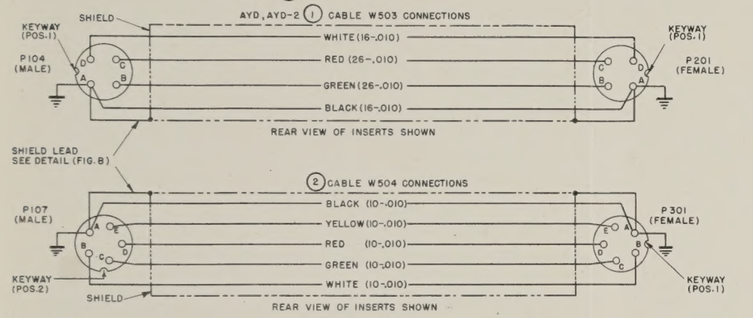
RAWING NO. SPLIT-SHELL	AMPHENOL NO. SPLIT-SHELL
M-253474-8	AN-3108-18-5S
M-253474-9	AN-3108-18-4P
M-253474-16	97-3108-18-20P-POS. 3
M-253474-10	AN-3108-18-20P
M-253474-11	AN-3108-24-3P
M-253474-12	97-3108-18-20P-POS. 2
M-253474-13	AN-3108-18-4S
M-253474-15	97-3108-18-20S-POS. 3
M-253474-14	AN-3108-18-20S

EQUIPMENT DIAGRAM	MODELS
DWG. P-255275	AYD, AYD-2
DWG. P-255247	AYD-3, ★AN/ARN-1

FOR MODELS AYD, AYD-2, AYD-3, ★AN/ARN-1

Figure 10—Control Cables—Outline-Assembly (Dwg. P-255243)





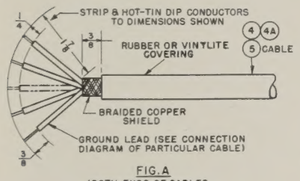

STRIP & HOT-TIN DIP CONDUCTORS TO DIMENSIONS SHOWN
RUBBER OR VINYLITE COVERING
CABLE
BRAIDED COPPER SHIELD
GROUND LEAD (SEE CONNECTION DIAGRAM OF PARTICULAR CABLE)

FIG. A
(BOTH ENDS OF CABLES W503 & W504)

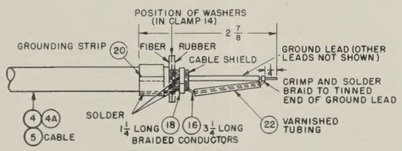


FIG. B
(BOTH ENDS OF CABLES W503 & W504)

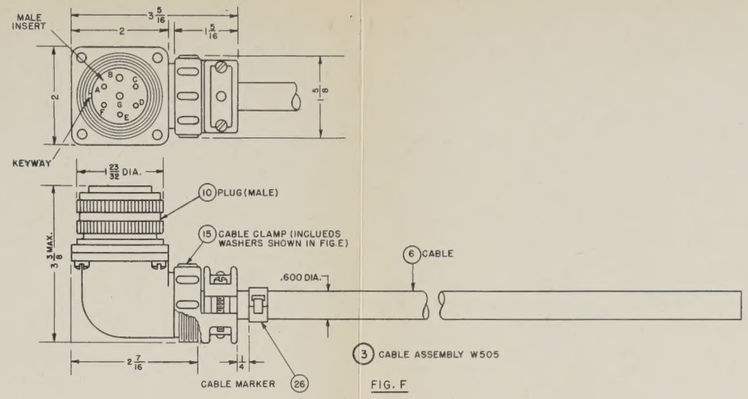
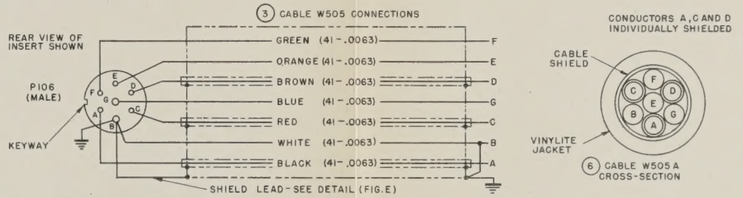


FIG. F



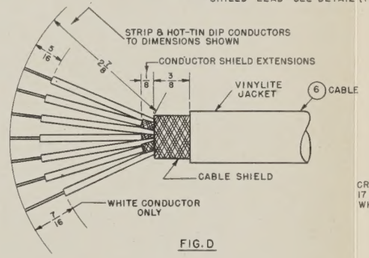


FIG. D

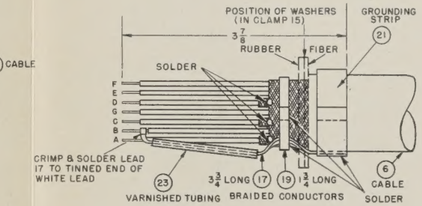


FIG. E

CABLES W503 AND W504
WIRING AND ASSEMBLY INSTRUCTIONS

1. CUT BULK CABLE 4 OR 5 TO LENGTH REQUIRED FOR THE PARTICULAR INSTALLATION (SEE EQUIPMENT DIAGRAM). PREPARE BOTH ENDS AS SHOWN IN FIGURE A.

2. ADD GROUNDING STRIP AND FLEXIBLE CONNECTION TO CABLE SHIELD AND GROUND LEAD AT BOTH ENDS OF CABLE, AS SHOWN IN FIGURE B, THUS: SOLDER BRAIDED CONDUCTOR 16 TO GROUNDING STRIP 20, THEN WRAP LATTER AROUND CABLE BODY IN POSITION SHOWN. WRAP BRAIDED CONDUCTOR 18 OVER CONDUCTOR 16 AND AROUND CABLE SHIELD; SOLDER BOTH LEADS TOGETHER AND TO SHIELD. SLIP VARNISHED TUBING 22 OVER CONDUCTOR 16, CRIMP END OF LATTER AROUND TINNED END OF GROUND LEAD ADJACENT TO INSULATION, AND SOLDER.

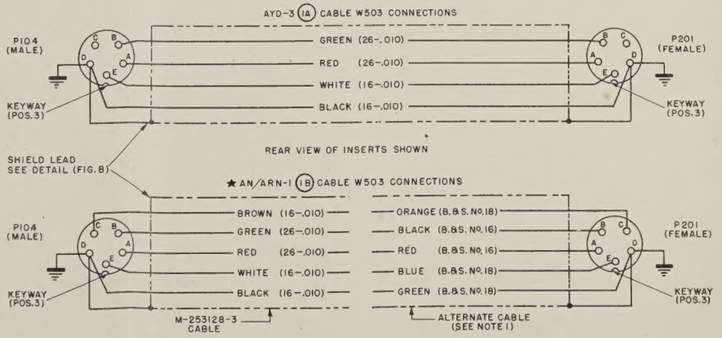
3. DISASSEMBLE ELBOW PLUGS 8 AND 12 (FOR W503) OR 11 AND 13 (FOR W504) AT FLANGE. LOOSEN SCREWS OF CLAMPS 14 AND SLIP CLAMPS AND PLUG ELBOWS SEPARATELY OVER CABLE ENDS IN PROPER RELATION AS SHOWN IN FIGURE C (FIRST MAKING SURE THAT CLAMPS CONTAIN THE FIBER AND RUBBER WASHERS AS INDICATED IN FIGURE B).

4. SOLDER CABLE LEADS TO CONNECTOR TERMINALS ACCORDING TO PROPER CONNECTION DIAGRAM.

5. REASSEMBLE PLUGS AND TIGHTEN FLANGE SCREWS AFTER ADJUSTING SWIVEL (PINNED TO CONNECTOR SHELL) TO DESIRED KEYWAY POSITION (SEE FIGURE C).

6. SCREW CABLE CLAMPS SOLIDLY TO ELBOWS. ADJUST LEAD SLACK TO ALIGN CLAMPS IN WITH GROUNDING STRIPS 20 (FIGURE B), THEN TIGHTEN CLAMP SCREWS TO ANCHOR CABLE AND TO PROVIDE GROUND CONNECTION TO CABLE SHIELD AT EACH END.

7. ATTACH CABLE MARKERS 24 AND 25 AT MALE PLUG ENDS OF CABLES W503 AND W504, RESPECTIVELY, AS SHOWN IN FIGURE C.



NOTE—FOR ALL SOLDERING, USE ONLY NONCORROSIVE ROSIN CORE SOLDER.

CABLE W505
WIRING AND ASSEMBLY INSTRUCTIONS

1. CUT BULK CABLE 6 TO LENGTH REQUIRED FOR THE PARTICULAR INSTALLATION (SEE EQUIPMENT DIAGRAM). PREPARE ONE END AS SHOWN IN FIGURE D.

2. ADD GROUNDING STRIP AND FLEXIBLE CONNECTION TO CABLE SHIELD AND WHITE LEAD AS SHOWN IN FIGURE E, THUS: SOLDER BRAIDED CONDUCTOR 17 TO GROUNDING STRIP 21, THEN WRAP LATTER AROUND CABLE BODY IN POSITION SHOWN. WRAP BRAIDED CONDUCTOR 19 OVER CONDUCTOR 17 AND AROUND OUTER SHIELD. SOLDER BOTH LEADS TOGETHER AND TO SHIELD; ALSO SOLDER SHIELD EXTENSIONS OF CONDUCTORS A, C AND D TO OUTER CABLE SHIELD. SLIP VARNISHED TUBING 23 OVER CONDUCTOR 17, CRIMP END OF LATTER AROUND TINNED END OF WHITE LEAD ADJACENT TO INSULATION, AND SOLDER.

3. DISASSEMBLE ELBOW PLUG 10 AT FLANGE. LOOSEN SCREWS OF CLAMP 15 AND SLIP CLAMP AND PLUG ELBOW SEPARATELY OVER CABLE END IN PROPER RELATION AS SHOWN IN FIGURE F (FIRST MAKING SURE THAT CLAMP CONTAINS THE FIBER AND RUBBER WASHERS AS INDICATED IN FIGURE E.)

4. SOLDER CABLE LEADS TO CONNECTOR TERMINALS ACCORDING TO CONNECTIONS DIAGRAM FOR W505.

5. REASSEMBLE PLUG AND TIGHTEN FLANGE SCREWS AFTER ADJUSTING SWIVEL (PINNED TO CONNECTOR SHELL) TO DESIRED KEYWAY POSITION.

6. SCREW CABLE CLAMP 15 SOLIDLY TO ELBOW. ADJUST LEAD SLACK TO ALIGN CLAMP WITH GROUNDING STRIP 21 (FIGURE E), THEN TIGHTEN CLAMP SCREWS TO ANCHOR CABLE AND TO PROVIDE GROUND CONNECTION TO SHIELDS.

7. ATTACH CABLE MARKER 26 TO CABLE NEAR PLUG AS SHOWN IN FIGURE F.

CABLE MATERIALS AND FITTINGS — FURNISHED IN BULK

ITEM NO.	SYMBOL DESIG.	DESCRIPTION		DRAWING OR SPECIFICATION	UNIT WEIGHT (POUNDS)	QUANTITY W503	QUANTITY W504N	QUANTITY W505	QUANTITY MISC.
1		ALTITUDE INDICATOR CABLE ASSEMBLY	FOR AYD, AYD-2	THIS DRAWING (4-PIN PLUGS, 4-WIRE CABLE)	–	X			
1A	W503		FOR AYD-3	THIS DRAWING (5-PIN PLUGS, 4-WIRE CABLE)	–	X			
1B			FOR ★AN/ARN-1	THIS DRAWING (5-PIN PLUGS, 5-WIRE CABLE)	–		X		
2	W504	ALTITUDE LIMIT SWITCH CABLE ASSEMBLY		THIS DRAWING	–			X	
3	W505	AUTOMATIC PILOT CABLE ASSEMBLY		THIS DRAWING	–				X
4	W503A	4-WIRE SHIELDED CABLE		RCA DWG. H-253128-1 (FOR AYD SERIES)	0.17/FT.	*	*		
4A	W503A	5-WIRE SHIELDED CABLE (SEE NOTE 1)		RCA DWG. H-253128-3 (FOR ★AN/ARN-1)	0.18/FT.		*		
5	W504A	5-WIRE SHIELDED CABLE		RCA DWG. H-253128-2	0.15/FT.			*	
6	W505A	7-WIRE SHIELDED CABLE		RCA DWG. H-253033-1	0.20/FT.				*
SEE NOTE 2 — 7	P103**	PLUG – ELBOW, 3 CONTACTS, FEMALE (BATTERY INPUT CONNECTOR)		RCA DWG. P-255073-52 (AMPHENOL 97-3108J-18-5S)	0.17				X
8	P104	PLUG – ELBOW, 4 CONTACTS, MALE		RCA DWG. P-255073-35 (AMPHENOL 97-3108J-18-4P)	0.15	1			
8	P104	PLUG – ELBOW, 5 CONTACTS, MALE		RCA DWG. P-255262-46 (AMPHENOL 97-3108J-18-20P-POS.3)Δ	0.15		1		
9	P105**	PLUG – ELBOW, 5 CONTACTS, MALE (ALT. LIMIT IND. CONNECTOR)		RCA DWG. P-255073-51 (AMPHENOL 97-3108J-18-20P)Δ	0.15				X
10	P106	PLUG – ELBOW, 7 CONTACTS, MALE		RCA DWG. P-255262-38 (AMPHENOL 97-3108J-24-3P)	0.34			1	
11	P107	PLUG – ELBOW, 5 CONTACTS, MALE		RCA DWG. P-255262-37 (AMPHENOL 97-3108J-18-20P-POS.2)Δ	0.15			1	
12	P201	PLUG – ELBOW, 4 CONTACTS, FEMALE		RCA DWG. P-255073-36 (AMPHENOL 97-3108J-18-4S)		1			
12	P201	PLUG – ELBOW, 5 CONTACTS, FEMALE		RCA DWG. P-255262-47 (AMPHENOL 97-3108J-18-20S-POS.3)Δ	0.17		1	1	
13	P301	PLUG – ELBOW, 5 CONTACTS, FEMALE		RCA DWG. P-255073-53 (AMPHENOL 97-3108J-18-20S)Δ	0.17			1	
14		CABLE CLAMP		RCA DWG. P-255073-34 (AMPHENOL AN-3057-10-6)	0.06	2	2	2	
15		CABLE CLAMP		RCA DWG. H-253375-31 (AMPHENOL AN-3057-16-10)	0.12				1
16		BRAIDED COPPER CONDUCTOR		RCA — PS-499 – 1/0 72-.005 TINNED (3-1/4 LONG)	NEGLIGIBLE	2	2	2	
17		BRAIDED COPPER CONDUCTOR		RCA — PS-499 – 1/0 72-.005 TINNED (3-3/4 LONG)	NEGLIGIBLE				1
18		BRAIDED COPPER CONDUCTOR		RCA — PS-499 – 1/0 72-.005 TINNED (1-1/4 LONG)	NEGLIGIBLE	2	2	2	
19		BRAIDED COPPER CONDUCTOR		RCA — PS-499 – 1/0 72-.005 TINNED (1-3/4 LONG)	NEGLIGIBLE				1
20		COPPER STRIP		RCA — PS-21 SOFT 1/2 X .010 TINNED (1-3/4 LONG)	NEGLIGIBLE	2	2	2	
21		COPPER STRIP		RCA — PS-21 SOFT 1/2 X .010 TINNED (2-1/8 LONG)	NEGLIGIBLE				1
22		VARNISHED TUBING		RCA — PS-50 BLACK .133 I.D. (1-3/8 LONG)	NEGLIGIBLE	2	2	2	
23		VARNISHED TUBING		RCA — PS-50 BLACK .133 I.D. (2-1/4 LONG)	NEGLIGIBLE				1
24		CABLE MARKER	ALTITUDE INDICATOR AYD SERIES	RCA DWG. 29810-1 (USED ONLY ON AYD, AYD-2)	NEGLIGIBLE	1			
			ALTITUDE INDICATOR AYD-3	RCA DWG. 29874-5 (USED ON AYD-3)			1		
			ALTITUDE INDICATOR ★AN/ARN-1	RCA DWG. 29874-1 (USED ON ★AN/ARN-1				1	
25		CABLE MARKER	ALT. LIM. SWITCH AYD SERIES	RCA DWG. 29810-4 (USED ON AYD, AYD-2, AYD-3)	NEGLIGIBLE				
			ALT. LIM. SWITCH ★AN/ARN-1	RCA DWG. 29874-4 (USED ON ★AN/ARN-1				1	
26		CABLE MARKER	AUTOMATIC PILOT AYD SERIES	RCA DWG. 29810-5 (USED ON AYD, AYD-2, AYD-3)	NEGLIGIBLE				1

X – SEE EQUIPMENT DIAGRAM FOR QUANTITY SUPPLIED PER EQUIPMENT.
* – FURNISHED IN CONTINUOUS LENGTHS OF 250-400 FEET ON REELS. SEE EQUIPMENT DIAGRAM FOR LENGTH SUPPLIED PER EQUIPMENT.
** – OUTLINE DIMENSIONS AS SHOWN IN FIGURE C FOR P104 (ITEM 8).
Δ – PLUG INSERTS WERE FORMERLY DESIGNATED "683P" OR "683S" INSTEAD OF "20P" OR "20S", RESPECTIVELY, IN AMPHENOL DESIGNATIONS.

NOTE 1 – ALTERNATE CABLE AS INDICATED IN CONNECTION DIAGRAM FOR W503 CABLE ASSEMBLY 1B MAY BE FURNISHED IN PLACE OF RCA DWG. H-253128-3 CABLE FOR A LIMITED NUMBER OF ★AN/ARN-1 EQUIPMENTS.

NOTE 2 – PLUGS OF SPLIT-SHELL CONSTRUCTION, INTERCHANGEABLE WITH THE FLANGE TYPE PLUGS SHOWN, MAY BE FURNISHED WITH SOME EQUIPMENTS, AS FOLLOWS:

ITEM NO.	SYMBOL DESIG.	RCA DRAWING NO. FLANGE TYPE	RCA DRAWING NO. SPLIT-SHELL	AMPHENOL NO. SPLIT-SHELL
7	P103	P-255073-52	H-253474-8	AN-3108-18-5S
8	P104	P-255073-35	H-253474-9	AN-3108-18-4P
		P-255262-46	H-253474-16	97-3108-18-20P-POS. 3
9	P105	P-255073-51	H-253474-10	AN-3108-18-20P
10	P106	P-255262-38	H-253474-11	AN-3108-24-3P
11	P107	P-255262-37	H-253474-12	97-3108-18-20P-POS. 2
12	P201	P-255073-36	H-253474-13	AN-3108-18-4S
		P-255262-47	H-253474-15	97-3108-18-20S-POS. 3
13	P301	P-255073-53	H-253474-14	AN-3108-18-20S

EQUIPMENT DIAGRAM	MODELS
DWG. P-255275	AYD, AYD-2
DWG. P-255247	AYD-3, ★AN/ARN-1

FOR MODELS AYD, AYD-2, AYD-3, ★AN/ARN-1

Figure 10—Control Cables—Outline-Assembly (Dwg. P-255243)

	ITEM NO.	SYMBOL DESIG.	DESCRIPTION	DRAWING OR SPECIFICATION	QUANTITY		
					P108	P109	E506
	1	P108	RESISTOR PLUG ASSEMBLY	RCA DWG. K-251872-501	X		
	2	P108A	PLUG, STRAIGHT, 7 CONTACTS, MALE	RCA DWG. P-255262-35 (AMPHENOL AN-3106-24-3P)	1		
	3	R152 R153	RESISTOR - COMPOSITION, PIGTAIL, INSULATED, 47,000 OHMS ±5%, 1/2 WATT	RCA DWG. K-82283-199 (ALLEN-BRADLEY, TYPE EB-1/2)	2		
	4		RUBBER GASKET, 1/8 THICK, 1-43/64 O.D., 3/4 I.D.	RCA DWG. K-251873-7 (AMPHENOL 9771-16)	1		
	5		ALUMINUM DISC, .032 THICK, 1/2 HD, 1-3/8 DIA.	RCA DWG. K-251875-1	1		
	6		KNURLED NUT (1" CONDUIT SIZE)	RCA DWG. K-251874 (AMPHENOL AN-3054-16)	1		
FOR AYD, AYD-2	7	P109	PLUG, STRAIGHT, 4 CONTACTS, MALE	RCA DWG. P-255073-55 (AMPHENOL AN-3106-18-4P)		X	
	8	E506	KNURLED CAP, ALUMINUM, 1-20 THREAD	RCA DWG. K-251728-2 (AMPHENOL TYPE 9760-16 LESS STUD AND CHAIN - HOLE OMITTED OR FILLED WITH DUMMY STUD)			X
FOR AYD-3, ★AN/ARN-1	9	P109	PLUG, STRAIGHT, 5 CONTACTS, MALE	RCA DWG. P-255262-48 (AMPHENOL 97-3106-18-20P-POS.3)		X	

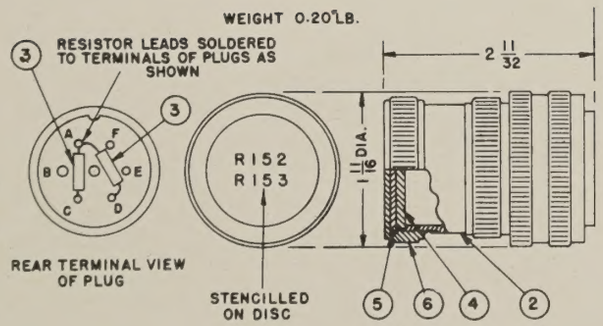
X - FOR QUANTITY SUPPLIED SEE EQUIPMENT DIAGRAM AS FOLLOWS:
DWG. P-255275 - FOR MODELS AYD, AYD-2
DWG. P-255247 - FOR MODELS AYD-3, ★AN/ARN-1

FOR MODELS AYD, AYD-2, AYD-3, ★AN/ARN-1

NOTE - PLUGS OF SPLIT-SHELL CONSTRUCTION, INTERCHANGEABLE WITH THOSE SHOWN, MAY BE FURNISHED, AS FOLLOWS:

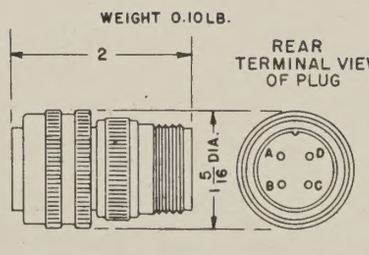
ITEM NO.	SYMBOL DESIG.	RCA DRAWING NO.	AMPHENOL NO.
2	P108A	M-253476-11	AN-3106-24-3P
7	P109	M-253476-12	AN-3106-18-4P
9	P109	M-253476-10	97-3106-18-20P-POS.3

Figure 11—Auxiliary Plugs—Outline-Assembly (Dwg. P-255321)



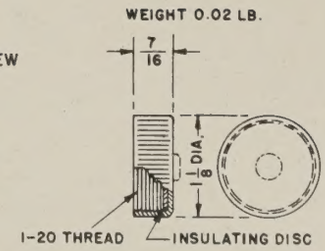
(1) P108

RESISTOR-PLUG ASSEMBLY FOR J106
FOR AYD, AYD-2, AYD-3, ★AN/ARN-1

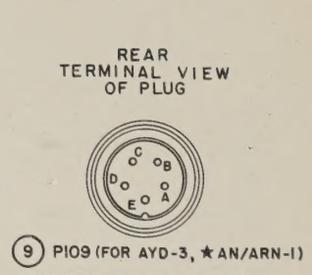


(7) P109 (FOR AYD, AYD-2)
AUXILIARY PLUG FOR J104

SHORT CIRCUIT OR SWITCH CONNECTION REQIRED BETWEEN TERMINALS B AND C TO COMPLETE BATTERY INPUT CIRCUIT. TEST MILLI-AMMETER (0-10 M-A FULL SCALE) CAN BE CONNECTED BETWEEN TERMINALS A AND D (CONNECT POSITIVE TERMINAL OF METER TO D AND NEGATIVE TO A).



(8) E506
CAP FOR
ITEMS 7 AND 9



(9) P109 (FOR AYD-3, ★AN/ARN-1)

DIFFERENT INSERT- OTHERWISE SAME AS ITEM 7.

USE TERMINALS A AND B FOR SHORT CIRCUIT OR SWITCH CONNECTION. CONNECT TERMINAL E TO POSITIVE AND D TO NEGATIVE OF TEST MILLI-AMMETER (0-10 M-A).

	ITEM NO.	SYMBOL DESIG.	DESCRIPTION	DRAWING OR SPECIFICATION	QUANTITY P108	QUANTITY P109	QUANTITY E506
	1	P108	RESISTOR PLUG ASSEMBLY	RCA DWG. K-251872-501	X		
	2	P108A	PLUG, STRAIGHT, 7 CONTACTS, MALE	RCA DWG. P-255262-35 (AMPHENOL AN-3106-24-3P)	1		
	3	R152 R153	RESISTOR - COMPOSITION, PIGTAIL, INSULATED, 47,000 OHMS ±5%, 1/2 WATT	RCA DWG. K-82283-199 (ALLEN-BRADLEY, TYPE EB-1/2)	2		
	4		RUBBER GASKET, 1/8 THICK, 1-43/64 O.D., 3/4 I.D.	RCA DWG. K-251873-7 (AMPHENOL 9771-16)	1		
	5		ALUMINUM DISC, .032 THICK, 1/2 HD, 1-3/8 DIA.	RCA DWG. K-251875-1	1		
	6		KNURLED NUT (1" CONDUIT SIZE)	RCA DWG. K-251874 (AMPHENOL AN-3054-16)	1		
FOR AYD, AYD-2	7	P109	PLUG, STRAIGHT, 4 CONTACTS, MALE	RCA DWG. P-255073-55 (AMPHENOL AN-3106-18-4P)		X	
	8	E506	KNURLED CAP, ALUMINUM, 1-20 THREAD	RCA DWG. K-251728-2 (AMPHENOL TYPE 9760-16 LESS STUD AND CHAIN - HOLE OMITTED OR FILLED WITH DUMMY STUD)			X
FOR AYD-3, ★AN/ARN-1	9	P109	PLUG, STRAIGHT, 5 CONTACTS, MALE	RCA DWG. P-255262-48 (AMPHENOL 97-3106-18-20P-POS.3)		X	

X - FOR QUANTITY SUPPLIED SEE EQUIPMENT DIAGRAM AS FOLLOWS:
DWG. P-255275 - FOR MODELS AYD, AYD-2
DWG. P-255247 - FOR MODELS AYD-3, ★AN/ARN-1

NOTE - PLUGS OF SPLIT-SHELL CONSTRUCTION, INTERCHANGEABLE WITH THOSE SHOWN, MAY BE FURNISHED, AS FOLLOWS:

ITEM NO.	SYMBOL DESIG.	RCA DRAWING NO.	AMPHENOL NO.
2	P108A	M-253476-11	AN-3106-24-3P
7	P109	M-253476-12	AN-3106-18-4P
9	P109	M-253476-10	97-3106-18-20P-POS.3

FOR MODELS AYD, AYD-2, AYD-3, ★AN/ARN-1

Figure 11—Auxiliary Plugs—Outline-Assembly (Dwg. P-255321)